

August 28, 1913

10¢ A COPY

MOTOR AGE



The dealer should demand

THREE'S a new slant to automobile selling and service to customers; something that has developed in the last year.

You know what this is, of course: the question of electrical equipment.

But do you realize your unlimited power, your ability to control the situation to meet your customer's needs?

You have the right to say what starter and lighting system go into every car you sell, no matter what its stock equipment is.

Make use of the right, *every time*. Make it help you to give the buyer the best equipment; the one that will give him the least trouble and the best service.

Your best way to sell any customer a second car is to help him reduce troubles on the first car he buys from you. The *less* trouble he has, the more likely he is to build up a frame of mind that will associate you with his next purchase.

Aplco electric equipment is the best, the most efficient, the most reliable that can be installed in any car. You can insist on Aplco equipment for 1914 deliveries; it will save complaints about less thoroughly tested and proved systems, if you do it every time.

The Aplco system is "amateur-proof;" when once installed it is a guarantee of no come-back on the dealer.

The battery is always fully charged. It cannot become over-discharged no matter how many starts are made in the course of a day. Nor can the battery be injured by overcharge.

There are no gears to push in and out of mesh and consequently no sticking, no danger of injury to the system through ignorance of electrical matters.

The Aplco equipment has scientifically developed with repeated tests under the direction of Vincent G. Apple himself.

Mr. Apple is the pioneer in the whole electric starter idea: obviously his outfit is not hurriedly-designed-to-meet-the-demand kind. Many engineers now agree that his idea is the right one—24 volts for starting, 6 volts for lighting, ignition, signaling, etc.

Aplco service stations in all principal cities are prepared to give service to Aplco users at any time.



Top View of Aplco Controller

From the small compact controller of the Aplco electric system the driver can start his motor; switch lights on or off; dim his headlights. He can lock starter, lights and horn; test flow of current; light his dash. This controller is the last word in simplicity and convenience. It typifies the whole Aplco equipment—simple, businesslike, and positive.

The Apple Electric Company

67 Canal Street, Dayton, Ohio

When Writing to Advertisers, Please Mention Motor Age.

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SEPARABLE
SHIMS

Supplied to Manufacturers

SOME OF THOSE WHO USE THEM:

- (75)—The Curtiss Motor Co. (Aeroplanes)
- (96)—Dorris Motor Car Co. (Automobiles)
- (29)—Fairmont Machine Co. (Gasoline Engines)
- (47)—Hupp Motor Car Co. (Automobiles)
- (157)—International Motor Co. (Motor Trucks)
- (292)—McKeen Motor Car Co. (R. R. Motor Cars)
- (298)—Mais Motor Truck Co. (Motor Trucks)
- (24)—Mercer Automobile Co. (Automobiles)
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NEW YORK CITY

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Sales Agent for the United States
140 West 42nd St., N. Y.

1254 Michigan Ave.,
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Truffault-Hartford Shock Absorbers on Mercer Cars Assure Safe Riding

The Mercer car is the latest addition to the fast growing big list of cars whose manufacturers now include Truffault-Hartford Shock Absorbers as standard equipment.

The Mercer is a very popular car among motorists—and because of its easy riding qualities has won the title of the "Touring Car de Luxe."

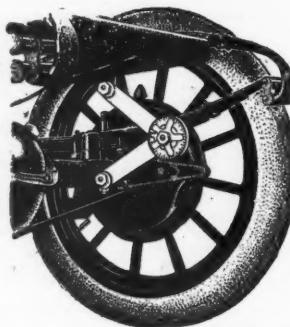
It has been prominently to the front in many great road races, its sensational victories stamping it as a real speed king. Among the Mercer's most sensational performances was the 500 mile Indianapolis Speedway Race, held May 30th, in which the Mercer won second place — its time being bettered by but one car and that one with a

cylinder displacement one and a half times that of the Mercer. On August 9th at a matinee meet at Brighton Beach, New York, Mercer cars flashed first by the finish in six races—second in five races and third in two races.

And in all these contests Truffault-Hartford Shock Absorbers helped the Mercer in its great victories—helped by greatly reducing the danger of tire, engine and spring breakage.

Truffault-Hartford
SHOCK ABSORBER
"The Pioneer Shock Absorber"

Truffault-Hartford Shock Absorbers make a good car even better. Their inclusion on the cars you make or sell supplies you with an important sales argument of unquestioned weight. Five models—\$15 to \$60. Send for catalog.



Insist Upon Truffault-Hartfords on Your New Car

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MOTOR AGE

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RHINELAND
MACHINE WORKS CO.
142 W. 42nd St. NEW YORK

Which Starter Uses Least Current?

At first thought one might imagine that an Electric Starter spinning at 150 R. P. M. would consume more current than the ordinary Electric starter which turns the engine slowly.

But repeated tests show exactly the reverse, and that the spinning Electric Disco, instead of consuming more current, actually uses less.

For example, we recently examined the batteries in six Disco-equipped cars, each of which had gone 25,000 miles, and the batteries were apparently good for years to come.

As another instance, two six-cylinder Discos equipped cars recently driven from Indianapolis to the Pacific Coast, arrived with batteries fully charged and in the best of condition. Throughout the trip, the Electric Disco spun the motor 175 R. P. M. It did not fail once.

The reason the Electric Disco uses less current than slow-turning Starters is that it starts the car INSTANTLY. We may use more power per second than others, but the time required to start is many seconds less.

The Limit of Simplicity

This 1914 Model 7E Electric Disco requires but **one** point of attachment to the engine, which eliminates trouble for the owner and materially simplifies installing it.

Note its **double-deck** design. It's as compact as a **motor-generator**, yet gives all the

THE DISCO CO. ⁷¹⁰ Dodge Building, **Detroit, U. S. A.**

efficiency and service of a two-unit Electric Starter. No other Electric Starter combines all these good points.

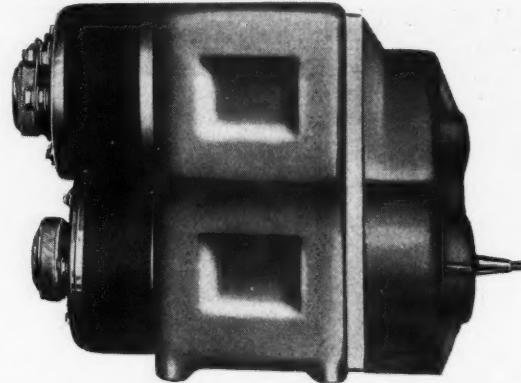
As to voltage, we give you your choice—6 or 12 volts.

Not a Mere Lighting Generator

Other two-unit Systems, as a rule, are using their ex-lighting generators for lighting and starting. This requires occasional recharging of batteries.

Not so with the Electric Disco. Our Generator is specifically designed to **start** and **light** the car and supply enough current to keep the battery fully charged at all times. **And it DOES it!**

For complete Description and Illustration of the Electric Disco, see our latest Book on Electric Starters. Sent free to any motor car maker, motorist or dealer.



ELECTRIC DISCO

STARTING **LIGHTING**

When Writing to Advertisers, Please Mention Motor Age.

MOTOR AGE

MISSOURI "SHOWS" A NATION



KANSAS CITY, Mo., Aug. 21—There are thousands of blistered hands in Missouri tonight as a result of a 2-day campaign for good roads in which highway improvement valued at \$2,500,000 were made by an army of 250,000 volunteer workers. Each blister is a badge of honor, emblematic of work well done. There are hundreds of miles of dirt roads in the state tonight, roads that were shunned as impassable on Tuesday.

"The cities are full of pride,
Challenging each to each—"
and the residents of countless villages and hamlets strut like peacocks, in the knowledge that their good roads' volunteers have "shown" a nation what modern miracles a quarter of a million men can accomplish in 2 days of labor with pick and spade, mule and horse, grader and scraper, dynamite and cement.

Rally Around the Shovel

At daybreak yesterday morning a mighty army of patriotic men, recruited from stores, offices and farms, and serving without pay, moved out upon the highways of the state and gave battle to the narrow and bumpy dirt roads, the steep grades and antique culverts and bridges. All through the scorching day they fought,

By J. C. Burton

Staff Representative

In response to a proclamation setting aside August 20 and 21 as Missouri's good roads' days and calling for volunteers to work upon the highways, issued by Governor Elliot W. Major in July, 250,000 men and 50,000 teams, representing \$2,000,000 in labor, turned out Wednesday and Thursday of last week and toiling without pay, made road improvements valued at \$2,500,000. In each of the 114 counties of the state, the roads were worked and although the greater part of the labor was centered on the improvement of old highways, it is estimated that between 2,000 and 3,000 miles of new roads were made. The cash donations are estimated at \$200,000, and the material bought and donated at \$300,000. Six thousand women served meals to the workers.

minister and bartender, banker and town loafer, judge and blacksmith, shoulder to shoulder—a most striking exhibition of practical democracy and civic patriotism with the pick, the spade and the hoe,

emblems of liberty, equality and fraternity.

A night's armistice was declared at sundown, but the soldiers of Missouri's good roads legions had just begun to fight. Early this morning the battle was resumed with renewed vigor and enthusiasm. Hundreds of raw recruits joined the ranks of the 1-day veterans, many of them Spartans who toiled on despite lame backs and swollen hands. Blasting was heard all along the line from Athens to Southwest City, from Watson to Douglas, and in the 114 counties of the state at least one-fourteenth of Missouri's entire population perspired and shoveled in a broiling sun that the disgrace of the commonwealth might be mitigated.

Road Army Is Victorious

The army disbanded tonight. It was victorious. At Jefferson City, the state capital, Governor Elliot W. Major estimated the value of the road improvements at \$2,500,000. The cost was ridiculously low. The expense of the 2-day campaign will not exceed \$5,000.

But figures alone are inadequate to show the results of the greatest of all good roads campaigns. Missouri has solved a



WHITE-BEARDED GRANDFATHERS WORKED BESIDE THEIR GRANDSONS

problem for a nation. Other states will follow her example. Arkansas already has set aside September 2 and 3 as good roads days. Governor George N. Hodges of Kansas, who journeyed across the state line to be "shown," has returned to the haven of grasshoppers to call for volunteers and proclaim two good roads days.Flushed with its success and already planning for 1914, Missouri prophesies that the movement will be national next year and that the residents of forty-eight states instead of one will shoulder spade and pick in a 2-day battle for highway improvement.

Good Roads' Spirit Kindled

"Stop talking, start working!" is Missouri's sane advice to her sister commonwealths.

The "show me" state has shown a per-

plexed country an immediate and satisfactory remedy for all road ills. It is work, volunteer but well-organized work.

"A good roads spirit has been kindled in Missouri which will bring rich fruitage for many years," said Governor Major tonight. "The road days have been such a splendid success that I expect to set aside the same days in 1914 and will call upon the governor of each state to do the same. These things will be potent factors in inducing the federal government to appropriate a goodly sum to aid the states in building highways."

Reviewing the entire movement at this time, when the clodded spade is idle and the tired mule brays proudly in its stall,

it is evident that Missouri has accomplished much since the memorable July day that Governor Major issued his proclamation and first called upon the citizens to "pull Missouri out of the mud." A n inspiration 1 month ago, Missouri's splendid good roads campaign is an epoch-making achievement tonight.

Comparing the wretched highways of

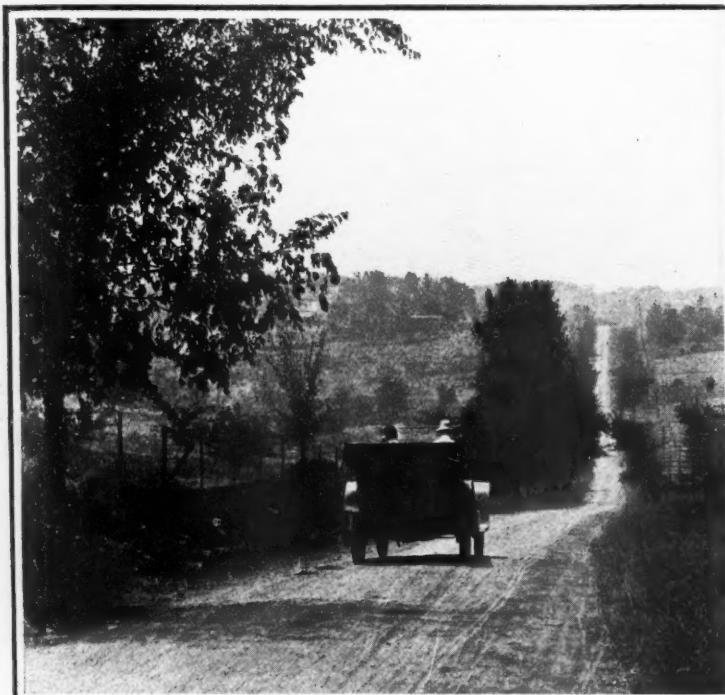
Tuesday with the improved roads of Thursday, you doubt if pigmy man could accomplish such a change. It seems as though a magician had waved his wand or a Hercules had been reborn to accomplish his eleventh labor. State-wide organization perfected, 250,000 volunteers recruited and \$500,000 in materials and money subscribed in a single month! Improvements on 5,000 miles of highways at an estimated value of \$2,500,000, made in 2 fleeting days! No wonder an astounded nation rubs its eyes and exclaims, "Almost incredible!" But Missouri has proofs of its colossal accomplishment; proofs that wind in and out through the hills and over the fertile lowlands, proofs that bring the farmer closer to the city and invite the motorist to drive over trails once trod by the pioneers—Boone and Lewis, Carson and Fremont.

Spark Becomes Mighty Flame

"Observe Missouri, you sluggards, and do likewise," would be the way in which King Solomon would be forced to paraphrase his oft-repeated proverb, were the wisest of all biblical potentates alive today.

The spark that became a flame and fired 250,000 men to action yesterday and today was struck but a short time ago by the Missouri American Daughters of the Revolution, who took the initiative in the good roads work by marking that part of the historic Santa Fe trail which crosses the Missouri river at Arrow Rock and passes westward through Grand Pass, Lexington and Independence to Kansas City.

In the presidential election of last No-



MOTORING IN MISSOURI IS AN ALTERNATE COAST AND CLIMB

vember, Missouri switched its allegiance from the republican to the democratic party, repudiated Hadley and elected Elliot W. Major as governor. The voters chose a man of action, an executive who realized the economic and social importance of good roads. Seven months after his inauguration, Governor Major called upon the citizens of the state to co-operate with him in his campaign for improved highways. The response was more than gratifying. It was almost unanimous. Led by the Kansas City Star, a most influential Missouri newspaper, the press started educational work and advised its readers to enlist in the good roads army.

Commercial organizations were prompt to respond. Subscription lists were circulated and money collected for the purchase of road materials and tools. One Kansas City mercantile house donated \$5,000 worth of spades and picks. Manufacturers of road machinery and gasoline tractors supplied the scrapers, drags, rollers and graders. Makers of explosives opened the doors of their powder houses and told the county highway supervisors that they might forage for dynamite without fear of molestation. Bags of cement also were put on the free list.

Merchants and professional men, who could not work on the roads because of press of business, subscribed \$4 each for the hire of substitutes. Over \$2,000 was contributed for this purpose by members of the Kansas City Commercial Club. Four Kansas City business men, now touring in Europe, cabled \$16 from Paris, that they might claim some of the glory in the great achievement. Scores of former residents of Missouri sent money to aid the good roads cause in the state of their birth.

Women Feed Volunteer Workers

Private motorists, the motor clubs of the state, and motor car dealers furnished the machines that transported the volunteers to the field of action. Forty cars, donated by the Kansas City Motor Car Dealers' Association, were put at the disposal of the Jackson county road workers. Hundreds of motor trucks, owned by manufacturing and large commercial establishments, were taken off freight runs and sent out into the country to haul crushed stone, cement and tools.

Not all the volunteers were men. Hun-

dreds of women, society leaders of the cities and rural belles and housewives, went to the front and formed a commissary department of which a European war lord would be envious. No army was better fed than the good roads legions of Missouri. Fried chicken was served by the barrel-load. Boiled ham was another entree. Hogsheads of iced tea, lemonade and water were put on the firing line, so

or bosses. On this permanent system of highway government was built the temporary system necessary for maximum results in the 2-day campaign. The overseers, after a tour of inspection of their districts, selected the roads that most needed improvement and made requisitions for supplies to the county superintendents. After the volunteer workers were enlisted, they were sent out to the several highways on which work was to be done, in charge of a road boss, who was responsible to the overseer for improvements made in his section. In some counties the county court appointed a temporary superintendent to assist the regular superintendent during the 2 days.

Overseers Serve Without Pay

The overseers and bosses, who are paid by the day when they work upon the roads, donated their services yesterday and today. The merchants of the cities and towns raised money for the purchase of gold watches and other prizes that were awarded the bosses in whose districts the most miles of road were improved and best worked.

Under such a system there was little confusion. The bosses reported to the overseers, the overseers to the county superintendents, and the county superintendents to the county clerks, who wired the results of the day's work each evening to Governor Major, who received the returns at the executive mansion, where he entertained Governor Hodges of Kansas.

At Jefferson City it was just like election night, all enthusiasm and suspense, but it is doubtful if ever any bulletins, forecasts of political victory or defeat, were ever watched with closer interest than the reports from the front, where the citizens had rallied to the support of a progressive state executive and, like the



MAJOR OF MISSOURI PUT HIS SPADE ALONGSIDE OF THAT OF HODGES OF KANSAS

near the workers that no "limpin' lump of brick-dust, Gunga Din," was needed. Green corn! Whole quarter-sections must have been ravaged to supply the demand of the hungry toilers. And the same splendid organization that marked the shoveling and grading was prominent in the commissary department. The State Federation of Women's Clubs and the Daughters of the American Revolution were leaders in this work.

Little Girls Carry Water

The farmer's wife perspired over a hot range while her husband and sons sweated on the road. Her small daughters and the little girls from neighboring farms formed a water-carrying brigade and trudged along the dusty roads with pails almost as large as they were. Scoffers at woman's suffrage should have visited Missouri yesterday and today and seen the part that women played in an enterprise so vast that the eyes of a nation were focused upon the "show me" state.

The organization and maneuvering of such a large army was not as difficult as might be imagined. Fortunately, Missouri has a modern and efficient system of highway supervision. Each of the 114 counties, under a county superintendent, is divided into districts, over which there is an overseer who appoints three assistants



THE GOVERNOR OF KANSAS AIDS A CONVICT IN GUIDING A SCRAPER



WORKMEN RECRUITED FROM COUNTY CLERK'S OFFICE RESTING AFTER LUNCH

soldiers of '61, had come 250,000 strong.

The story of the creation of the world is considered a masterpiece because of its terseness. What masterpieces were sent clicking over the wires to Jefferson City last night and this evening! Only cold, bare facts they contained, but between the lines you could read the story of a state aroused and a battle for a glorious cause won.

How was the mighty army recruited? The following telegrams, paeans of victory disguised as statistics and chosen at random from the scores received at the state capital last night, show how Major's volunteers enlisted:

A conservative estimate shows that 3,000 men and 300 teams worked on the roads of Franklin county today.

Marion county responded with 2,000 men and 1,000 teams on the roads today.

Six hundred men were on the firing line in Phelps county today.

Reports from all over Cole county indicate that more than 1,000 men worked on the roads today.

Fifteen hundred put in a full day's work on Webster county roads today. More tomorrow. Seven hundred full days' work were put in on the roads here; greatest stride for road improvement Shelby county has ever known.

When the returns from the counties in the Ozark mountains began to pour in, it was evident that the "hill-billies" were doing themselves proud. It was in that section where the least work had been expected and where it was needed most, but it was there, judging from the telegrams, that some of the largest brigades of volunteers were recruited. Here live



VOLUNTEERS AT OAK GROVE WASHING UP AFTER A MORNING'S LABOR

the primitive people of the state, people who still wear homespun and have yet to see their first railroad train. Out of the hills they came, these sturdy mountaineers, to work at the side of the crossroads storekeeper and the circuit rider.

The volunteers of Missouri's good roads army were like the workers in Kipling's Utopia, where

"No one shall work for money,
And no one shall work for fame—
But each for the joy of working—"

The farmers formed the backbone of that army, and not without a sacrifice. Missouri now is as dry as if baked in a lime kiln. The brown pastures are mockeries. The corn crop is ruined. Water is at a premium. In many districts the farmers were hauling water for their live stock at 3 o'clock in the morning, that they might report to the road boss at 7 o'clock and work for 10 hours on the highways. For 2 days the fall plowing was abandoned, although it is time to sow the winter wheat. But for the costly drought the farming communities would have furnished 100,000 additional volunteers.

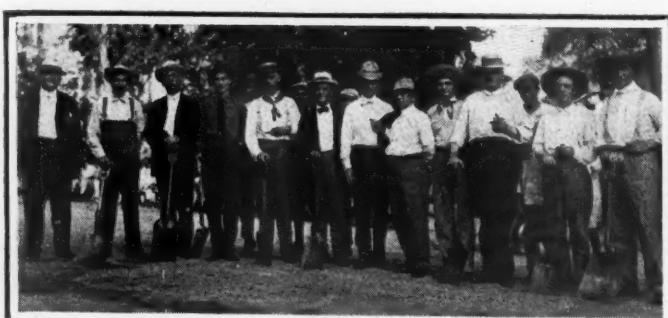
The small towns and villages were practically deserted yesterday and today. The bankers changed their alpaca coats for

hickory shirts and worked with spade instead of pen. The storekeepers measured rods of road instead of yards of calico. The butchers cut weeds instead of beef. Even the town loafer became infected with the good roads spirit and vacated his favorite seat on the baggage truck that he might carry water for the workers, such a labor not interfering greatly with the rolling of cigarettes.

Business Men Among Recruits

On a 150-mile ride from Salisbury to Kansas City over a historic state highway, representative business men were seen at work on the roads and, with the farmers, were blasting out hills, using the dirt to fill in depressions between the grades, substituting steel for wooden culverts, pouring concrete for new bridges that were to replace antique structures of planking and iron. Scraping, dragging and rolling were accomplished at one operation with gasoline tractors. Women in motor cars served refreshments at noon, and along the fences for miles were scattered baskets of lunch and barrels of iced tea, lemonade and water. The stores and banks at Keytesville, Carrollton, Harden, Richmond and Excelsior Springs were closed.

At Independence, the county seat of Jackson county, the members of the county clerk's office turned out to a man. The prosecuting attorney pleaded with a pick and shovel. The county clerk proved as efficient at breaking big rocks into little ones as at examining abstracts and titles. This corps of soft-handed officials volunteered to improve a stretch of road that



GOVERNOR MAJOR AND HIS ROAD CORPS, WHICH INCLUDED A U. S. CONGRESSMAN AND SUPREME COURT JUDGE

had not been worked since the red day Morgan's raiders rode over it when Missouri was disputed territory. This neglected 3-mile highway was overgrown with weeds and brush yesterday morning. Tonight it has been cleared, plowed, scraped and rolled. The rural mail carrier need not avoid it as he has in the past decade. His day of detouring at this point is over.

Once when the governor of South Carolina met the governor of North Carolina he made some such statement as this:

"It's a long time between drinks."

What the governor of Missouri said to the governor of Kansas today was:

"You'd better take a bigger shovelful."

Two Governors On the Job

For Hodges of Kansas put his shovel alongside the spade of Major of Missouri and both worked shoulder to shoulder with the state convicts in the vicinity of Jefferson City. Governor Major, clad in a pair of khaki trousers and soft shirt, steered a big grader over $\frac{1}{2}$ mile of dirt road yesterday, and the distinguished visitor from Kansas, in 63-cent overalls, guided the big scraper blade. Today they made a tour of inspection over Callaway, Boone and Cole counties in a motor car with a battery of motion picture cameras focused on them.

You can't brag over a summer day in Kansas City or the standing of the St. Louis Browns in the American League, but you've got to take your hat off to the governor of Missouri.

Even the convicts worked with an enthusiasm and state patriotism that was surprising. The negroes laughed and sang as they toiled in the broiling sun. The convicts let out a mighty yell, threw caps in air and broke all prison rules when the governor told them how many days he was going to cut off their sentences. This official promise of liberal commutation and watermelon on the noon bill of fare inspired them to herculean efforts and they shoveled and plowed with the frenzy of an ancient knight fighting for some holy cause.

There was no age limit placed on the volunteers. On a stretch of road near Hickman's Mills, a grandfather, with white beard hanging down to his waist line, worked beside his two grandsons, one a boy of 12 and the other 2 years younger. This morning a wrinkle-faced patriarch approached a road boss in charge of a gang working on the outskirts of

Kansas City and declared:

"I want to help on the roads. I'll be 83 in October, but I can still do a day's work."

And he rolled up one sleeve and showed a muscular arm bronzed by many summers' toil.



ROAD BOSS OF JACKSON COUNTY CALLING FOR VOLUNTEERS

Women not only toiled in the kitchen that the workers might be fed but turned out upon the highways and labored with the men. Mrs. Thomas Kincaide, wife of a farmer living near Lee's Summit, was not satisfied with an assignment in the commissary department but insisted on doing some of the road work. She was given a scythe and spent the day cutting weeds. Miss Lena Fields of Lee's Summit recruited a squad of twenty-four volunteers by personal solicitation over the telephone, guaranteed to provide chicken dinner for them and inspected the work of her brigade as



VOLUNTEER WORKERS MAKING THE DIRT FLY IN JACKSON COUNTY

well. Armed with buckets of red, white and blue paint, members of the Daughters of the American Revolution marked the telegraph poles along the Santa Fe trail.

The task of compiling the official returns of Missouri's good roads' days will not be finished by Highway Commissioner Buffam and his assistants for several days. When computed, it is believed the exact figures will exceed the estimates of Governor Major.

Missouri's good roads days are not over, although Governor Major's proclamation called for 2-day volunteers only. For weeks throughout the state small gangs of well-organized men will continue to improve the highways. What is more, the serpent's teeth of Cadmus have been sown, and two men armed with spade and pick will spring up next year where but one sprang up yesterday and today.

Near Lee's Summit I came to the fullest realization of how enthused the residents of Missouri were over the good roads movement. Twenty farmers were working there, changing a cow path into a rural boulevard. We stopped to take their pictures, chatted a while, and then started toward Kansas.

"We all will see you all here next year," yelled the bronzed boss after us.

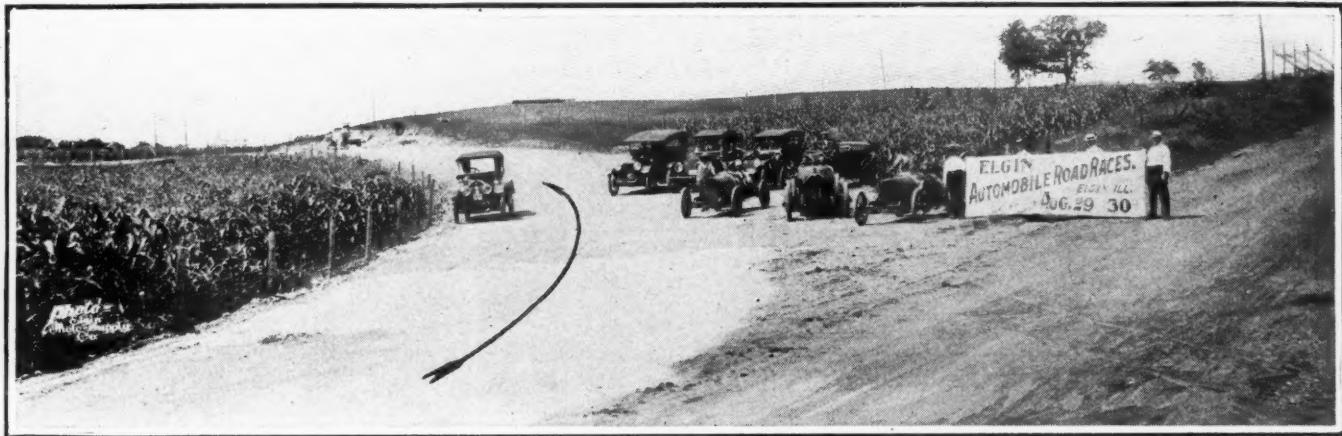
It was more than a trite farewell—it was a solemn promise.



A CHAIN GANG BREAKING BIG ROCKS INTO LITTLE ONES

Star Drivers of Nation Await Starting Bomb at Elgin

Twenty-four Cars Will Meet in Two Races on Kane County Course



McQUEEN'S TURN, WHERE ELGIN RACE PROMOTERS HAVE CUT BETWEEN HILLS TO IMPROVE COURSE

CHICAGO, Aug. 25—When the drawing for numbers for the fourth annual Elgin road races, promoted by the Chicago Automobile Club and the Elgin Automobile Road Race Association, took place this afternoon it developed the fact that we of the middle west have been able to recruit the most brilliant field of cars and drivers in the annals of the Kane county classics. With but one or two exceptions—like Earl Cooper and Teddy Tetzlaff of Pacific coast fame—every pilot of note in the country has signed to participate in the speed battles which are scheduled for next Friday and Saturday. Dame Fortune, presiding over the drawing, decreed that the cars should start in the following order:

CHICAGO AUTOMOBILE CLUB TROPHY		
No.	Car	Driver
20	Deltal	Dawson
21	Mercer	De Palma
22	Mason	Rickenbacher
23	Mercer	Wishart
24	Mason	Chandler
25	Nyberg	H. Endicott
26	Mason	Mulford
27	Mercer	Luttrell

ELGIN NATIONAL TROPHY		
1	Case	Bill Endicott
2	Mason	Rickenbacher
3	Mason	Mulford
4	Mercer	Wishart
5	Stutz	Auderson
6	Marmon	Dawson
7	Mason	Haupt
8	Keeton	Burman
9	Nyberg	Madden
10	Deltal	Not named
11	Nyberg	H. Endicott
12	Velle	Henning
14	Mercer	De Palma
15	Isotta	Grant
16	Erwin Special	Bergdolt
17	Tulsa	Hughes

The Peugeot, which Jules Goux drove to victory Memorial Day in the 500-mile race and which was entered conditionally at Elgin by E. J. Schroeder, will not start because a new front axle, ordered by cable from France, will not arrive in time. Ralph Mulford, who was to have driven the French car, has substituted the Mason and the field for the second day's race will not be diminished.

There is some doubt about Hughes. He was injured at a track meet in Oklahoma a month ago and it is doubtful if he has recovered enough to stand

a grueling race like the one in which he has entered.

It had been expected that both Hemery and Pilette, European drivers of note, would compete, the pair having been entered by E. C. Patterson, who contracted with Pilette to bring over two Mercedes sixes for Elgin. First Pilette was unable to find Hemery, he says, then the Belgian wired that he himself was too ill to visit this country. Also he declined to send a substitute or even a car, which left Patterson without an entry. It is said that Pilette's case will be brought to the attention of the European authorities and an effort made to have him barred from further competition until he straightens matters with Patterson. Had the Mercedes come in, Europe would have been well represented, with the Peugeot and Isotta already entered.

Two Races Are Scheduled

Elgin has departed from custom this year in scheduling only two races, whereas last year five were run. Both races are at the same distance—301 miles—and an effort has been made to make one as important as the other. Each has the same prize money—\$2,500, divided three ways, \$1,750, \$500 and \$250. In addition on the first day there is a cash prize of \$200 hung up by Ira M. Cobe, while David Beecroft is making the same offer for the second day. The two trophies are equally famous. The Chicago Automobile Club trophy, hung up the first day, is the old Cobe cup which first was raced for at Crown Point in 1909 and won by Louis Chevrolet in a Buick and again on the Indianapolis speedway in 1910, when Joe Dawson in a Marmon won it. Since then it has been in retirement.

The Elgin National trophy is given by the Elgin National Watch Co. and has been raced for three times. Mulford in a Lozier took it in 1910, Zengel in a National in 1911 and de Palma in a Mercedes in 1912. Both Mulford and de Palma are trying for

it again in Saturday's contest at Elgin.

The course this year is shortened about 350 feet because of the change made at McQueen's turn. To get away from a bad left-handed turn there, the Elgin promoters cut between two small hills and made a big bend which is so easy to negotiate that it can be taken wide open. Indeed, Bill Endicott and Harry Grant have driven it at 70 miles an hour. The new measurement makes the circuit exactly 8 miles 2,030 feet in length.

Another improvement in the course has been made in the back-stretch, where some of the narrow bits have been widened. Right now a few of these spots are a trifle rough, but in general it is conceded that the circuit is in better shape than it ever has been. Whether or not the winners will do better than 70 miles an hour, de Palma's old mark, is doubtful, for the 450-inch limit prevails, whereas last year 600 was the limit. However, considering the class of the field, it would not be surprising if the record went in this year's big race.

Dawson Shows Fans Speed

Elgin, Ill., Aug. 24—Because of his showing in the second day of practice, Joe Dawson and the Deltal is now regarded as a serious contender of the Masons and Mercers in the first day's race for cars of 350 cubic inches displacement and under, to be run Friday. Dawson negotiated the 8½-mile circuit in 7:31, an average of approximately 69 miles an hour.

Spencer Wishart also showed the rail birds some speed today when he drove a lap in 7:18. Harry Grant in the Isotta turned one circuit at an average speed of 67 miles an hour. Dawson warmed up the Marmon he is to drive Saturday and negotiated a lap in 7:24. DePalma averaged 7:50 for seven laps with the big Mercer.

A minor thrill was afforded when Haupt's Mason caught on fire at the pits, but prompt attention prevented serious injury to the car.

Georges Boillot, in Peugeot, Is Victor on Mont Ventoux

Grand Prix Winner Shatters Record in Europe's Hill Climbing Classic

PARIS, Aug. 24—Special cablegram—

Tradition was sustained and a new record established on Mont Ventoux today when Georges Boillot, dean of the Peugeot racing team and winner of the 1913 grand prix of France, won the hill-climbing classic of Europe in the powerful car that he drove to victory over the Amiens circuit last month.

Boillot negotiated the 13 and a fraction miles of steep and tortuous grades in 17 minutes and 38 seconds, clipping 8 seconds off his own record of 17 minutes and 46 seconds made last year when he bettered the 1909 mark of Bablot and averaged 39.7 miles an hour in the ascent.

This is the fifth time in as many years that the winning car in the Mont Ventoux classic has been the same as that which won the grand prix. Boillot averaged better than 40 miles an hour in the Peugeot today.

The Mont Ventoux event is the oldest, most important and most difficult hill climb in Europe, and Boillot's victory adds another wreath to his already laurel-loaded head.

The other class winners and their times follow:

Car and driver	Time
Aquila Italiana, Marsaglia	21:52
Aquila Italiana, Argentina	22:58
Vermorel, Gaste	26:28
Metallurgique, Riviere	26:42
Schneider, Juvanon	28:17

The fastest cyclecar proved to be the Baby Peugeot, driven by Gehin, which negotiated the hill in 31:30.

HILL CLIMB HELD AT NEWPORT

Indianapolis, Ind., Aug. 25—The annual hill-climb at Newport was held last Wednesday and Thursday, under the auspices of the Newport Automobile Club and with the sanction of the American Automobile Association. W. S. Gilbreath, secretary of the Hoosier Motor Club, Indianapolis, was the official representative of the A. A. A.

There was an attendance of 2,500 on Wednesday and of 4,000 on Thursday. Company B of the First Regiment, Indiana National Guard, Terre Haute, policed the hill, and there were no accidents. The hill is 1,600 feet long, ranging from a 3 per cent to an 18.65 per cent grade. There were twelve amateur events the first day. The program Thursday was for professionals only. A new record for the hill was established when D. C. Teeter, driving a Staver in one of the professional events, climbed the hill in 16 $\frac{1}{2}$ seconds.

A straight-away start of about 200 yards was allowed, with a turn at the foot of the hill. Many of the spectators and participants were from Illinois. Several Indiana counties were represented. I. M. Casebeer is president and J. B. Grauer is secretary of the Newport Motor Club. Summary:

WEDNESDAY

Event No. 1—Class E, nonstock, 230 cubic inches piston displacement and under—Won by Ford, E. McNees, Paris, Ill., time, :21 $\frac{1}{2}$; second, Studebaker, K. R. O'Hair, Paris, Ill., time, :24 $\frac{1}{2}$; third, Buick, W. T. Dee, Mecca, Ind., time, :32.

Event No. 2—Class E, nonstock, 231 to 300 cubic inches piston displacement—Won by Ford, E. McNees, Paris, Ill., time, :21 $\frac{1}{2}$; second, Studebaker, K. R. O'Hair, Paris, Ill., time, :25 $\frac{1}{2}$; third, Halladay, E. C. Wolverton, Atwood, Ill., time, :28 $\frac{1}{2}$; fourth, Buick, W. T. Dee, Mecca, Ind., time, :32 $\frac{1}{2}$. Marmon and Parry entries were withdrawn.

Event No. 3—Class E, nonstock, 301 to 450 cubic inches piston displacement—Won by Pope-Hartford, R. L. Ammerman, Clinton, Ind., time, :22; second, National, J. A. Boo, Newport, time, :28; and third, Jackson, Jack Stearns, Newman, Ill., time, :29 $\frac{1}{2}$.

Event No. 4—Open to drivers of Vermillion county, Ind.—Won by Pope-Hartford, R. L. Ammerman, Clinton, time, :22 $\frac{1}{2}$; second, National, J. A. Boo, Newport, time, :27.



*August 29-30—Elgin road races, Chicago Automobile Club.
 August 30-September 2—Grade 111 Reliability, Automobile Club of Seattle.
 August 30-September 6—Reliability run, Chicago Motor Club.
 *August 31—Beach races, Oceanside, Cal.
 September 1-5—Grade 111 Reliability run, Houston Automobile Club.
 September 1—Track race, Davenport, Ia.
 *September 1-2—Track race, Sioux City, Ia.
 *September 6—Track race, Hamlin, Minn.
 *September 8-13—Chicago Motor Club's Around Lake Michigan reliability.
 *September 9—Corona beach race, Corona, Cal.
 September 12—Track meet, Canfield, O.
 September 13—Track meet, Grand Rapids, Mich.
 *September 13—Track meet, Covington, Ky.
 September 14—Track meet, Seattle, Wash.
 September 18—Hill climb, Asheville, N. C.
 September 20-21—Track meet, Detroit, Mich.
 September 21—French light-car road race, Boulogne.
 September 25—Tourist trophy stock-car road race, Isle of Man, Great Britain.
 September 27—Track meet, White Plains, N. Y.
 *September 27-28—Track meet, Bakersfield, Cal.
 October 3—Track meet, Trenton, N. J.
 October 3-4—Track meet, Oklahoma City, Okla.
 October 4-11—Chicago Motor Club's Around Lake Michigan reliability.
 November 2-3—Los Angeles-Phoenix road race.
 November 4-5—Road race, El Paso, Tex., to Phoenix.
 November 6—Track meet, Phoenix, Ariz.
 *November 24—Vanderbilt road race, Savannah, Ga.
 *November 27—Savannah grand prix.

*Sanctioned by A. A. A.
 †Sanctioned by A. C. A.
 SHOWS, CONVENTIONS, ETC.
 September 20—American road congress, Detroit, Mich.
 October 6-18—St. Louis show.
 October 15-25—Electric show, Grand Central palace, New York city.
 October 17-27—Paris show.
 October 27-28—Convention Electric Vehicle Association of America, Chicago.
 November 7-15—Olympia show.
 December 9-12—Annual convention of American Road Builders' Association, Philadelphia.
 December 11-20—First International Exposition of Safety and Sanitation, New York city. American Museum of Safety.
 January 3-10—New York show, Grand Central palace.
 January 24-31—Chicago show.
 January 26-31—Scranton, Pa.
 January 31-February 7—Minneapolis show.
 February 21-28—Newark, N. J.
 February 22-March 5—Cincinnati, O.

Event No. 5—Open to drivers of Edgar county, Ill.—Won by Ford, E. McNees, Paris, Ill., time, :21 $\frac{1}{2}$; second, Studebaker, K. R. O'Hair, Paris, Ill., time, :21 $\frac{1}{2}$.

Event No. 6—Open to drivers of Fountain county, Ind.—Won by Marion, Guy G. Bales, Kingman, time, :36.

Event No. 7—Open to drivers of Park county, Ind.—Won by Buick, W. T. Dee, Mecca, time, :31 $\frac{1}{2}$. A Parry entered by Elmer Garrard was withdrawn on account of mechanical trouble.

Event No. 8—Open to drivers of Vigo county, Ind.—Won by Pope-Hartford, Everett Hultz, Terre Haute, time, :21.

Event No. 9—Open to all amateur drivers of fifth Indiana congressional district for cup offered by Congressman Ralph W. Moss—Won by Pope-Hartford, Everett Hultz, Terre Haute, time, :21 $\frac{1}{2}$; second, Pope-Hartford, R. L. Ammerman, Clinton, time, :22 $\frac{1}{2}$.

Event No. 10—Open to drivers of Vermillion county, Ill.—No entries.

Event No. 11—Open to drivers of Warren county, Ind.—No entries.

Event No. 12—Class D, nonstock, free-for-all—Won by Ford, E. McNees, Paris, Ill., time, :21 $\frac{1}{2}$; second, Pope-Hartford, Everett Hultz, H. L. Johnson, Lafayette, time, :21 $\frac{1}{2}$; fourth, Jackson, Jack Stearns, Newman, Ill., time, :28; fifth, Halladay, E. C. Wolverton, Atwood, Ill., time, :31 $\frac{1}{2}$. A Buick, Marmon and Pope-Hartford did not start.

THURSDAY

Event No. 1—Class E, nonstock, 230 cubic inches piston displacement and under—No entries.

Event No. 2—Class E, nonstock, 231 to 300 cubic inches piston displacement—won by Ford, S. U. Johnson, Universal, Ind., time, :31 $\frac{1}{2}$.

Event No. 3—Class C, nonstock, 301 to 450 cubic inches piston displacement—no entries.

Event No. 4—Class E, nonstock—Not run on account of rain.

Event No. 5—Class E, nonstock, 451 to 600 cubic inches displacement—Won by Staver, D. C. Teeter, time, :16 $\frac{1}{2}$; second, Gray Fox, Frank Fox, Indianapolis, time, :18; third, Shambaugh, Charles Shambaugh, Lafayette, time, :21; fourth, Apperson, Claire Rhodes, Terre Haute, time, :31 $\frac{1}{2}$.

Event No. 6—Class D, nonstock, free-for-all—Won by Gray Fox, Frank Fox, Indianapolis, time, :20; second, Shambaugh, Charles Shambaugh, Lafayette, time, :22; and third, Apperson, Claire Rhodes, Terre Haute, time, :30.

RICHFIELD FEATURE TO CHALMERS

Utica, N. Y., Aug. 23—Eleven events, eight for motor cars and three for motorcycles, were staged today in the Richfield hill climb conducted by the Automobile Club of Utica at Richfield Springs. The free-for-all, the feature of the card, was won by Robert G. Campbell, who negotiated the seven-eighths of a mile course in 55 seconds in a Chalmers roadster. The summaries:

Class A, Tuller Trophy—Won by Metz "22," James Connelly; time, 1:05 $\frac{1}{2}$. Second, Ford, E. B. Hague; time, 1:11 $\frac{1}{2}$.

Class B, Cary Cottages' Trophy—Won by Paige "36," J. W. Hitchcock; time, 1:29. Second, Apperson, W. M. Kilbourn; time, 1:35 $\frac{1}{2}$.

Class C, Utica Cycle Co. Trophy—Won by Abbott-Detroit, F. R. Winslow; time, 1:14 $\frac{1}{2}$. Second (tie), Overland, G. M. Francis, and Chalmers "30," Sidney Shires; time, 1:19 $\frac{1}{4}$.

Class D, the Berkley-Waiontha Trophy—Won by Mercer, C. C. Coupe; time, 1:05 $\frac{1}{2}$. Second, Mercer, Charles Decker; time, 1:12.

Class E, the Kendallwood Hotel Trophy—Won by Chalmers "6," H. W. Skinner, driver; time, 1:00 $\frac{1}{2}$. Second, Chalmers "6," W. B. Westcott; time, 1:05 $\frac{1}{2}$.

Class F, Sears Auto Supply Co. Trophy—Won by Pierce, F. J. Rath; time, 1:07 $\frac{1}{2}$. Second, Pierce "36," W. F. Carroll; time, 1:11 $\frac{1}{2}$.

Class G, the Earlington Trophy—Won by Packard "48," L. W. Roberts; time, 57 $\frac{1}{2}$ seconds. Second, Lozier "46," W. B. Westcott; time, 1:06 $\frac{1}{2}$.

Free-for-all, the Darrow House Trophy—Won by Chalmers "40" roadster, R. G. Campbell; time, 55 seconds. Second, Packard "48," L. W. Roberts; time, 57 $\frac{1}{2}$ seconds.

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Stop Talking—Start Working

MISSOURI once more has carved her name on the pinnacles of fame—once more has her show-me policy triumphed—once more has she demonstrated to a nation what can be done when you stop talking and start working, in brief, when you adopt the show-me policy. Building \$2,000,000 worth of roads in 2 days is a herculean task itself. But that is not half the story, the real tale is that it was built for \$5,000—surely a new milestone in road building finance.

AND Missouri did it all; conceived the scheme, not an imitation policy, and on her own initiative carried it into effect, and successfully, too. Missouri, by her 2-day road building program of last week when 250,000 men of the state worked in the scorching sun and with spade and shovel in hand, and more than 50,000 wagons donated their time to road building, set a mark for the world to aim at. Missouri initiated a new regime in road building, the talkless regime in contrast with the talking regime that has held the rostrum for so long.

MISSOURI has accomplished the impossible. Whoever imagined that a governor would take his shovel in hand and demonstrate it is mightier than the pen, and mightier far than the sword? Who for one short moment imagined that ministers would doff the sackcloth and don the overall, that bankers, merchants, butchers, grocers, farmers, all—all would join in one mighty army and for the general good of the Missourian commonwealth, work 3,000 miles of highway. It was an undreamed of accomplishment; a show-me object lesson that will be carried down the tides of centuries; an object lesson that other states are already endeavoring to fashion after. Bravo, Missouri!

Locomotives vs. Motors

THE announcement of the \$50,000,000 American Locomotive Co. discontinuing its motor car and motor truck business which it has carried for 7 years, came as an unexpected thunderbolt to the industry last week. If money is the great requisite for success in the motor car field, then this announcement surely must be a paradox, for here is a concern with unlimited capital, a concern making millions annually out of its locomotive business, and surely a concern capable of developing and producing motor cars and trucks. But it has discontinued its motor business, discontinued it because it continually has lost money in it.

MONEY is not everything in building motor cars; neither is design, although both are essential. With these must be production ability, shrewd buying of materials, and careful merchandising of the vehicle after produced. Success is spelled only when all of these are lived up to. You cannot use one of these requisites and be successful; you cannot court success with any two—you must have all.

SUCCESS in the motor car field is not an easy road. It calls for the Roman firmness of finding a way or making it. It means that cars must be designed to meet the market of the masses. It means that cars must be put on the market in marketable seasons, and not months behind rival companies. It means economy in production. It means buying materials as needed and not having vast supplies scrapped at the end of each season. It means a sure and fixed policy, not a vacillatory one dependent on the every-day whims of some members of the board of directors.

THE motor car business offers good fields for investment, as good as ever before, but it must be intelligent investment. All the money in a score of banks will not run a motor car factory if the product is not suited to present-day requirements; if the price is not right; if the manufacturing policy is an extravagant one; if the advertising is months behind time; and if there is an unsettled policy from year to year.

Importance of Grease Cups

TO many motorists grease cups are simple affairs, some of which require a little daily attention, others a semi-weekly turning and others attention once a week. The grease cup is of greater importance than often given credit for. It has an important bearing on the running of the car. Cases are on record where a car was turned into the repairshop to have steering gear adjusted and made right, when a goodly supply of grease made a new part out of it. From that date forward a part turn of the grease cups on the steering gear and on the various steering connections made an entirely new car out of one that was looked upon as quite imperfect.

THE free running of a car is largely dependent on the attention the grease cups receive. With every part well lubricated a car will take a hill on high in romping fashion, but with dry grease cups the driver drops to second and wonders what is wrong with the motor; wonders why it pulls so poorly; perhaps wonders why it pounds. The grease cup answers the question.

ON every car are many important grease cups, those that must receive frequent and careful attention. Those on rapidly revolving parts must always be given daily care. The clutch cone, the fan shaft, the pump shaft, the universal joints, the rear wheel bearings, etc. The driver who neglects these and similar important parts is using too much gasoline and is cutting down the life of his machine. He is slowly making up a big repair bill, a bill for new bushings and new parts in many parts of the machine when the annual overhauling time comes 'round.

DRIVERS should be certain that grease cups are filled regularly. If this work is done by a garage assistant, take the time to watch that it is really being done. Filling grease cups is too important to be trifled with. The careful car owner should give his car that consideration which it deserves, namely, seeing to it that all grease cups are regularly filled and regularly turned down as needed. Neglect means larger repair bills.

Armored Motor Cars Prove of Value in Mexican Rebellion

Federals Use Seventeen War Vehicles to Repulse Attacks of Huerta's Enemies

LAREDO, Tex., Aug. 23—During the last few weeks the motor car sale agencies and accessories establishments in Laredo and San Antonio have enjoyed a large trade from the Mexican government, through the purchasing department of the army of that country. It is stated that accessories and supplies to the value of many thousands of dollars have been sold to the Mexican army by Texas concerns during the period that the federals have been in control of Nuevo Laredo, situated just across the Rio Grande from Laredo. Large shipments of these purchases also have been made by the government agents to Monterey and as far south as the City of Mexico.

The utility of armored motor cars in the campaign which the federals are waging against the rebels in different parts of the country has been fully demonstrated, it is stated. General Rubio Navarette, commander of the military department of that portion of northern Mexico where the constitutionalists under Governor Venustiano Carranza are operating, has a fleet of seventeen of these cars in almost constant operation. The headquarters of this novel adjunct of the army is at Nuevo Laredo. Each car is equipped with two machine guns. The armoring of the cars was done by expert mechanics in the shops at Nuevo Laredo and Monterey.

It is stated that the cars have proved their worth in a number of encounters with rebels. The chief difficulty has been with the tires, but with proper attention in the matter of keeping constantly on hand an ample reserve supply of these and other repairs little interference has been met with in the conduct of military opera-

tions. It is planned by the government to keep adding to the armored car fleets from time to time as the exigencies of the campaign may require.

This fact has attracted agents of a number of concerns to San Antonio and border points, in addition to the already established salesmen. It is known that President Victoriano Huerta is a great believer in the utility of motor cars in time of warfare. During his arduous campaign against the rebels while Madero was president General Huerta made good use of motor cars in getting from one place to another in quick time. Several motor cars were devoted to his personal use and those of other officers.

WELCOME HOOSIER TOURISTS

Indianapolis, Ind., Aug. 25—A complimentary dinner to the Indiana-Pacific tourists was given at the Claypool hotel last Friday evening. About 400 Indianapolis and Indiana men were present to welcome home the men who recently completed the long trip to Los Angeles under the auspices of the Indiana Automobile Manufacturers' Association.

The toastmaster was Charles Warren Fairbanks, former vice-president of the United States, who for many years has been an enthusiastic motorist and an earnest advocate of good roads. The dinner was arranged by a committee representing the Indianapolis board of trade, Indianapolis chamber of commerce, the Hoosier Motor Club and the Indianapolis Automobile Trade Association. Dr. J. H. Taylor was chairman of the joint committee arranging the dinner and introduced the toastmaster.

"We welcome you home," said Mr. Fairbanks, "but from the reports we have heard it seems that you were at home wherever you were."

Governor Samuel M. Ralston was warmly received when he said he had become an advocate of good roads since a recent trip he made to eastern states. Governor Ralston said he thought the tourists had done more to "boost" Indiana than any similar movement in recent years.

W. J. White, of Crawfordsville, replied for the Indiana Automobile Trade Association. He took the place on the program of J. I. Farley, of Auburn, who was unable to be present. H. O. Smith, president, also spoke from the standpoint of the association, and said that it was only within the last few years that a motor car can safely journey across the United States, this now being possible because of the perfect stage the motor car has reached.

Charles A. Bookwalter, who made the tour in the interest of the Lincoln highway movement, replied for the tourists and described in a graphic and entertaining manner the entire trip from beginning to end. He was followed by W. S. Gilbreath, secretary of the Hoosier Motor Club, who explained motion and stereopticon pictures of the trip.

NO MORE GARDEN EXHIBITIONS

New York, Aug. 25—In all probability Madison Square Garden saw its last motor car show during the past winter, and there is very little chance that it will ever again hold one. Both the A. C. of C. and the M. & A. M. exhibits will be stationed at the Palace in 1914 and probably at all later shows as well.

Lincoln Highway Promoters Adopt Flag That Will Fly From Coast to Coast

Where is the hand-sewed flag of Betty Ross,
The flag that waved o'er sons of Liberty;
The banner with the stripes of red and white
And stars, upon a blue field, ten and three?
Its threads are rotted and the bunting torn
But it's preserved for our posterity.

Where is the flag 'round which the boys in blue
Once rallied in the days of '61—
The stars in that flag numbered thirty-four—
The shot-rent flag of Vicksburg and Bull Run?
Now furled it stands in some Grand Army hall,
A relic of great service nobly done.

For flags of peace replace the flags of war;
We raise our glass, another flag to toast,
A flag of Progress linking East to West,
A flag that prompts a cheer and haughty boast;
For aye the Lincoln Highway flag shall fly
And guide the motor pilgrim to the coast.



The Lincoln Highway Association, through its national headquarters in Detroit, is seeking publicity for the proposed macadam road from Atlantic to Pacific in every way possible. On the recent tour of the Indiana Automobile Manufacturers' Association from Indianapolis to San Francisco, each car carried a Lincoln Highway flag similar to the one shown in the illustration.

Alco Maker Quits Manufacture of Cars

Lower Prices Announced to Dispose of Stock

NEW YORK, Aug. 23—The American Locomotive Co., builder of Alco touring cars and trucks, voted to discontinue its entire motor car business at a meeting of its directors held August 13. The passenger cars and trucks on hand are being disposed of at fire-sale prices, reductions of little more than one-half the list price. Materials on hand in the big factory at Providence, R. I., will in the next 3 months be worked into complete vehicles, by which time it is hoped all manufacturing will be completed.

All selling agency arrangements have been cancelled and the company's selling branches at New York, Boston, Philadelphia, Chicago and Montreal will be disposed of as soon as possible.

To Continue Service Station

The parent company, that is, the American Locomotive Co., the largest builder of railroad locomotives in the country and with its half dozen big plants scattered throughout the east, has seen to it that every owner of an Alco truck or passenger car will be able to buy spare parts and get repair work done for years to come. The big service building in Long Island City, just across the river from New York, will be continued indefinitely and will be headquarters for Alco motor car supplies and repairs, with C. Arthur Benjamin, present sales manager, in charge.

The action of the board of directors in so suddenly ending the motor car and truck business came as a flash of lightning out of a clear sky, because on February 10, 1913, Leigh Best, first vice-president of the Locomotive company and in charge of finances, was placed in direct charge of the motor car department and at that time the announcement was made that thenceforth the Alco would have a definite fixed policy so far as motor cars and trucks were concerned, and that it would in a few years take a premier position in the field. Since then nothing was heard until last week, when the announcement of entire discontinuance was made at the annual meeting of the company.

President Makes Announcement

The announcement made by W. H. Marshall, president, was brief and as follows:

The board of directors of this company at a meeting held on August 13, 1913, decided to discontinue the manufacture and sale of motor cars and motor trucks. The company takes this opportunity to assure all owners of Alco vehicles that arrangements will be made to furnish them with repair parts for a period of not less than 5 years to come, and, further, that it will fulfill in every respect its obligations given under guarantee to its customers.

The undoubted reason for this action lies in the fact that the company has lost money on practically every passenger car, taxicab and truck sold by it since 1906, when it entered the field. This loss was an annual story each year at the regular meeting, held between August 15 and 30,

the question was invariably asked, "Shall we continue the motor car business or not for another year?" From those who have been close in touch with the affairs of the motor car department it is evident that of late these annual losses exceeded \$500,000, due largely to poor production methods and general uncertainty regarding the policy to be followed from one year to another.

The engineering, selling and advertising departments rarely knew before the annual meeting at the close of August what policy and program they could carry out for the following year, whereas at this date rival companies had their models for the following year on the market and well advertised. Advertising appropriations that were asked for in June were not forthcoming until the end of October or early in November.

Being impossibly late in getting its production, selling and advertising departments at work on the new models made it certain that the annual output would rarely if ever be sold, and although the car program called for 250 vehicles annually, there never was any reduction in this number, no matter how late the policy for the year was decided upon, the result being that the following July or August found the company with twenty-five to 150 unsold passenger cars on hand at a time when other companies were marketing their models for a succeeding year.

Old Models Worked Over

In such a situation there were but two policies to follow: First, cut the price and so demoralize matters in general; and, second, work these models over and carry them along as new types for the following year. The second policy often was followed, and it proved a most expensive matter. These held-over models were dismantled and changes in chassis and bodies made, changes which added enormously to the price, so that when finally disposed of they were marketed at a great loss. Taxicabs were sold at \$2,100 which showed a factory cost of labor, time and materials of \$2,600. Added to this loss of \$500 per vehicle was that of selling, advertising, overhead, etc. Four-cylinder cars that were said to show a factory cost for time, material and labor of \$3,700 were sold at \$3,600. These losses were directly due to too late determining of policies and poor production methods.

Last year, 1912, the company's business was 85 per cent trucks and 15 per cent pleasure cars. This season, 1913, 250 passenger cars were built and material bought for 1,000 trucks, of which from 600 to 800 have been completed. There is now on hand material for approximately 400 trucks, but very few passenger cars.

For 1914 the company had planned an

entire new program for the passenger-car field. Early last spring it contracted with an engineer, of Bayonne, N. J., to develop a light six-cylinder car which was to be marketed for 1914 and all of the present high-priced, high-powered models discontinued. The first three cars of this new model have been on the road for some time, and they must represent an investment of \$25,000 to \$40,000. This fact alone is significant in view of the vote on August 13 to discontinue, which vote must have been little considered previous to the meeting of the directors.

New Model Came Too Late

This new model has six cylinders, 4 by 5 inches, L-head, and cast in cylinder groups of threes. As a fine passenger touring car it was listed at \$3,400. While made in but one model it was to be built in three chassis lengths to accommodate different bodies. But like the general policy of the company in its motor car department, this new model came too late. Two years ago it would have been a winner, a money-maker with Alco finances and the enterprising advertising and selling methods used at that time by the company.

A cursory investigation shows that there were many other methods connected with the motor car department of the company that spelled certain failure, and that while its locomotive department was conducted along regular lines, the hesitation in the motor car end made success impossible. Production was poor. They had fifty-seven different models in 7 years, an average of over eight different models in the same factory each year, and to make matters worse some of these were taxicabs, some passenger cars and the majority trucks. With such a program economic production was impossible. At one time when six different models were coming through there were six different motor sizes: A taxicab, a four-cylinder car, a big six, a 5-ton truck, a 2-ton truck, and a new design of 3-tonner.

Fail to Standardize Cars

Added to this impossible multiplicity of models was that of failure to standardize among these different ones. The company built its own steering columns and parts and built a different one for each model, including two truck types.

The company built its passenger car rear axles, a combination stationary and live type of most excellent design, but at enormous cost. The special machine for making the stationary part cost \$58,000, yet was only needed to produce 250 annually. Had the company built axles for other concerns, which it would not do, this expensive equipment might have been converted from a loss to a profitable investment.

The purchasing department was not infrequently open to censure in that it overbought. The engineering, sales and advertising departments would recommend an output of 800, and the purchasing department would buy for 1,600 vehicles. The buying all was done at once instead of

being spread over a definite period. From some of the older employees connected with the factory comes tales of finding 2,700 pieces for models that not more than ten or twelve were made. In the factory machines were found manufacturing parts for 2 weeks after such parts had been altered or discontinued. In some of its truck models one-half the parts were made in metric sizes and the other half in inch dimensions, a particularly difficult manufacturing job.

The history of the Alco car dates to 1906, when the American Locomotive Co. purchased the rights to build the Berliet, of Lyons, France, in America on a royalty basis. The manufacture was carried on at Providence, R. I., in a remodeled locomotive plant which the company had on its hands. After 3 years the royalty agreement was discontinued and the company brought out its own line of cars and introduced the name Alco. Soon after this the truck business was started.

Alco Maker Rich Concern

The American Locomotive Co. is a \$50,000,000 corporation and had \$6,000,000 invested in the motor car department. The Long Island service building is valued at \$120,000, with parts at \$125,000. The Chicago branch has a valuation of \$112,000, a stock of \$175,000 parts is carried on the Pacific coast. The Philadelphia and Boston branches were rented properties.

The revised schedule of prices on the passenger cars and trucks, which the company is at present rapidly disposing of, is as follows:

"Effective this date, the following prices will prevail to close out the balance of our trucks and pleasure cars.

	Price	Former
2-ton chassis	\$1,975	\$2,950
3½-ton chassis	2,325	3,650
5-ton chassis	3,000	4,750

Six-cylinder touring car, complete with Rushmore self-starter 3,500 6,000
 "A deposit of at least \$200 will be required with each car or chassis ordered; the balance will be on sight draft with bill of lading attached f. o. b. Providence. Tire specifications will be followed as far as we are able, but we reserve the right to equip with any standard tires we may have on hand. No bodies will be furnished by us except for the touring cars. All truck chassis will be furnished in the lead as heretofore. The touring cars are complete in every way including Rushmore electric self-starter, and are finished in standard colors. Orders will be filled and cars shipped in the order in which they are received. First come, first served."

The Alco was at one time prominent in the racing game and with Harry Grant at the head of the team twice won the Vanderbilt cup.

COLUMBIA FACTORY CLOSING

Hartford, Conn., Aug. 25—Henry W. Nuckols, general manager of the Columbia Motor Car Co., stated this afternoon that the big plant at the corner of Park and Laurel streets, would be closed down for good about the first of the month. Mr. Nuckols said that he did not know just what the Maxwell company would do with the property, which has been on the market for some time. When asked why the Maxwell organization desired to unload the plant he said it was because it had no use for it. It is certain that the factory will

not be operated again as a Maxwell proposition.

Mr. Nuckols was asked how many Silent Knight type of six-cylinder cars were built at the factory this season. He stated that a few had been built for samples. When asked what plans he had for the future General Manager Nuckols said that it was problematical. He had, he said, a number of propositions under consideration for some time past. It is quite likely that he will remain in the east. John R. Hills, a Hartford builder, recently appraised the land and buildings, minus the mechanical equipment, at \$338,000.

Leo A. Korper, of the Capitol City Lumber Co., stated this afternoon that his concern had purchased 10 acres in the Columbia tract which lies west of Park river facing on Park street and the railroad tracks. The lumber company will remove its business to this site at a later date. It may possibly figure in the plant proper.

R. C. H. CREDITORS MEET

Detroit, Mich., Aug. 25—A meeting of the creditors of the R. C. H. Corp. was held with the receiver, the Security Trust Co., of this city, on August 20, at which no definite action was taken pending the completion of the inventory and appraisal of the plant. Due to the sentiment existing among those interested, it is probable that the concern will be offered for sale in the usual manner. Several parties are willing to buy the business in such an event, and it is practically certain that the making of R. C. H. cars, which have gained a firm foothold both in this country and

abroad, will be continued. Eventually, the preferred creditors will very likely get 100 cents on the dollar if matters work out as they should.

MIDLAND MAKES AN OFFER

Moline, Ill., Aug. 25—The Midland Motor Co., of East Moline, through its vice-president, Jean A. Page, has filed in the United States court at Peoria an offer of composition with its creditors in the sum of 20 per cent cash on the amount of all claims allowed against the bankrupt estate. This is the largest bankruptcy case to come up in the Peoria district court since it was established.

The claims will approximate \$400,000. The plant has been valued at \$107,000, with scattering assets of \$12,000, making a total of \$119,000.

HARRIS OPTIONS ANNULLED

Detroit, Mich., Aug. 25—The options held by Harris Bros. on the plants of the Flanders Mfg. Co. at Pontiac and Chelsea, Mich., have been annulled. A public sale of these properties will be held on September 8 and 9. Some time ago the Flanders electric plant was sold to E. Leroy Peltier for the manufacture of the Tiffany electric car. About the same time the Studebaker Corp., Inc., bought the plant E to be used for the manufacture of gears, and later acquired another one of this group formerly known as the Vulcan gear plant, which now is called plant 15, in which it has established a complete service factory. The remaining properties at Pontiac will be sold on September 8 and the Chelsea properties on the following day.

Walpole Tire Decision Again Deferred

BOSTON, MASS., Aug. 23—Once more Judge Dodge in the United States district court here put over today the settling of the question of an additional receiver to act with Robert C. Fischer, who was appointed some time ago, for the Walpole Tire and Rubber Co. Claims and counter-claims have been made; meetings have been held there and in New York, but nothing has resulted definitely. The judge now states that he will give a decision of some sort next Wednesday.

Hotchkiss & Co., the bankers who placed a large amount of the stock, have sent out letters to stockholders in relation to the receivership. The letter urges that the stockholders join in an application for a general receiver, especially to represent the interests of the stockholders. The Hotchkiss company officials say that they are not satisfied with the business ability of the present receiver or the existing situation, and they do not believe that the interests of the stockholders are safe in the hands of a single receiver acting at the advice of a committee of creditors. They want another receiver to act especially for the stockholders' interests.

At the hearing before Judge Dodge to-

day attorney Garfield, representing a committee of the minority creditors, stated that the committee was in favor of a co-receiver and suggested the name of R. A. Skinner, president of the Derby Desk Co. He stated that the affairs of the Walpole Tire and Rubber Co. had been juggled and that he believed the same interests which brought about the trouble were now trying to control the receivership.

Attorney Morris, counsel for the creditors' protective committee, which represents a majority of the claims, made an analysis of the situation and said that it appeared that less than \$135,000 was represented by the minority creditors instead of \$225,800 claimed at the hearing last week. It was brought out that a majority of the stockholders seemed to oppose the plan of a co-receiver, most of the opposition came from the directors holding stock, one of the directors holding 1,250 shares of preferred stock. Attorney Sears, who represented seven Ohio banks, said he favored the appointment of Mr. Skinner. It is expected that the atmosphere will be cleared Wednesday by Judge Dodge, but he gave no inkling of what he proposed to do in the matter.

Would Regulate Fuel Prices

Oklahoma Commission Fights Alleged Discrimination

USTIN, TEX., Aug. 23—Motorists and other users of gasoline in Texas as the authorities of this state are watching with interest the efforts that are being made by the corporation commission of Oklahoma to regulate the price of the commodity in that state. It is claimed by Attorney-General B. F. Looney, of Texas, that the manufacturers and sellers of petroleum products in this state discriminate against home consumers in the matter of prices.

In Oklahoma the situation is even worse, as is shown by investigation. In some towns in that state gasoline is sold as low as 13½ cents per gallon; in others the price is 16 cents and in the extreme western part it is as high as 30 cents. While the prices in different parts of Texas do not range as widely as in Oklahoma, there is some difference which is alleged not to be justified by the additional cost of transportation of the product. The fact that motor cars are using such enormous quantities of gasoline causes marked attention to be given to any fluctuation of the price of that product.

REO REDUCES PRICE FOR 1914

Lansing, Mich., Aug. 27—The Reo Motor Car Co. announces a new fall series for the standard Reo 30-horsepower touring car and roadster which carries with it a reduction of \$220 from the former price. The body of the latest model is of new design, low hung with cowl dash and gondola back. The instrument board, with all instruments set flush, is within easy reach of the driver and the electric searchlights have a special dimming attachment.

POPE CALLS A MEETING

Hartford, Conn., Aug. 23—A meeting of the stockholders of the Pope Mfg. Co. has been called for September 22 to take final steps in the plan formulated and announced some months ago of changing from a Connecticut to a Massachusetts corporation. The meeting is to be held at the company offices in this city and is for the purpose of terminating the corporate existence of the Connecticut company, all its assets having already been transferred to the Massachusetts company.

RESIGNS TO BUILD CAR

Detroit, Mich., Aug. 25—H. D. W. MacKaye, formerly assistant to the president of the Keeton Motor Car Co., has entered the motor car field, with a low-priced vehicle which will sell for less than \$500. The name of the company, which was formed recently, has not been divulged, but it is stated that it is composed of men well-known in the business.

The new concern is capitalized at \$1,500,000, with \$300,000 paid in. Already a test car is on the road and the engineers of the new company are looking carefully

for places of improvement. The name of the car has not been announced up to this time, but is known that a three-passenger roadster and a four-passenger touring car will be marketed. The wheelbase of the chassis is 100 inches, and the motor of four cylinders. The car is in no sense a cyclecar, being designed to supply the demand in the low-priced small-car field.

NOAIROUT WINS INJUNCTION SUIT

Buffalo, N. Y., Aug. 26—Judge Hazel in the United States district court today filed

final decree with perpetual injunction restraining John A. Schuler, of Buffalo, from making, selling or imitating a patented product of the Buffalo Specialty Co., known as Noairout and used for stopping leaks in rubber tires. The decree comes at the conclusion of a long contest waged by the Specialty company to restrain parties from manufacturing this product on which it holds rights. Schuler was named defendant in the test case brought to trial. Judge Hazel in his decision holds Schuler guilty of infringing upon the patents of the complainant and ordered the plaintiff to re-

The Motor Reefer for September Nights



SEPTEMBER NIGHT is not threatened with police censorship. It is the ideal time for motoring with a harvest moon shining in the sky and the first faint breath of Autumn in the air. But like September Morn, September nights often are a trifle cold and the woman who rides in the car should be protected against the chilling wind. Such protection is offered by the motor reefer of imported chinchilla which comes in green, red, blue, tan, white and Nell rose. It fastens close to the neck with small bone bullet buttons and has a wide belt, with pockets at each side on the front, and a Balkan collar. The coat shown in the illustration sells for \$18.50 and is from the motoring department of Mandel Bros., Chicago. With the reefer coat of green, the Tango sombrero of green felt with white hemp edging and gros grain pleated bow at the side is the proper thing. Such a hat costs \$8.

A Motor Coat for Waning Summer Days



WITH the passing of August and the coming of September, fickle 1913 divorces Summer and takes Autumn to spouse, but for many days yet the discarded season will vent her calorific spite on motorizing mortals and a light-weight coat will be as greatly appreciated during the next 4 weeks as it was during sun-scorched July. Such a coat is shown by Mandel Bros., Chicago. It is made of natural pongee and lined throughout with Copenhagen blue silk. This coat is 54 inches in length, has a cutaway front, soft collar and set-in sleeves and fastens high at the neck with self buttons. It sells for \$20. The hat shown in the illustration is a turban of blue silk and straw which is ornamented with colored embroidered motifs on the revers and draped with a blue chiffon veil. The price of the turban is \$20.

cover the costs of the recent injunction.

It is expected that this decision will have a bearing on future suits for infringement of tire-filing and puncture proofing compound patents and possibly will clarify the atmosphere.

NEW WHEEL COMPANY ORGANIZING

Indianapolis, Ind., Aug. 25—Capitalists at Connersville are organizing the American Motor Wheel Co., which will be incorporated shortly with an authorized capitalization of \$550,000. The new company will manufacture an elastic wheel, which is designed on what are believed to be entirely new principles.

The wheel is the invention of Henry G.

Coates, a farmer and medical student living near Veedersburg. A solid rubber tire will be used on the rim, but inside the rim will be mounted a set of six small pneumatics. These will be connected to the axle by a spider, so constructed that the pneumatics will be held in place and so that there will be no dishing or bending. There will be no spokes.

GENERAL MOTORS ANTICIPATING NOTES

Detroit, Mich., Aug. 11—The General Motors Co. again has anticipated the payment of its notes and has paid \$1,000,000 to the Central Trust Co. on the amount which comes due October 1, 1913.

Talks on Ethyl Alcohol Uses

Denatured Spirit Valuable as Fuel and Carbon Remover

KANSAS CITY, Mo., Aug. 23—That tax-free ethyl alcohol, manufactured under the United States government laws—known commercially as denatured alcohol, was the most natural material for the removal of carbon and the cleansing of gasoline engines, was claimed in a lecture last evening by Professor A. Anglada, of New York, before those in attendance at the national gas power show here. Professor Anglada is chairman of the metropolitan section of the Society of Automobile Engineers and an expert in the manufacture and operation of gas engines.

He treated the subject of denatured alcohol as a natural carbon remover and cleanser of all types of gasoline engines. He told in detail the causes of carbon formation in engine cylinders and the disadvantages resulting therefrom. The feature which seemed to impress the convention was the extreme ease with which an engine could be treated with denatured alcohol as well as the absolute harmlessness and safety of the product.

In connection with his paper, Professor Anglada brought out the fact that the ordinary gasoline farm engine can be run without change on denatured alcohol by simply starting it on gasoline, shutting off the gasoline and introducing denatured alcohol into the inlet pipe, and that a series of experiments conducted in the presence of the secretary of the association had proven that denatured alcohol, when thus introduced, served as a scavenger of troublesome deposits and loosened and drove them out with the exhaust gases.

WEBB JAY QUITS HAYNES

Chicago, Aug. 25—Webb Jay, who has been the vice-president and active manager of the Haynes Motor Car Co., of Chicago, has resigned and disposed of his interests in the concern. Mr. Jay's future plans are not definitely known, but it is expected that he will devote considerable time to development and sale of several motor specialties which he controls. H. E. Doty succeeds Jay as manager of the Haynes Chicago branch.

GRAY & DAVIS OPEN NEW PLANT

Detroit, Mich., Aug. 25—Gray & Davis have opened the Sprague-Waldo plant here. Three hundred men are being put on and \$70,000 worth of machinery installed for the manufacture of lamps. Fred E. Holmes, formerly Detroit representative, will act as manager.

FRANK E. SMITH LOCATES

Indianapolis, Ind., Aug. 25—Frank E. Smith, manager of the National Spring Co., of New Castle, Ind., and who was for many years previous production manager of the Maxwell-Briscoe plant at New Castle, has been appointed to a similar position with the American Motors Co., of Indianapolis, and will take active hold immediately.

Milwaukee Has Substitute for Gasoline

Consists of a Chemically Treated Kerosene and Denatured Alcohol

A CONTENDER for the \$100,000 prize offered by the International Association of Recognized Automobile Clubs for the best substitute for gasoline as a motor fuel has appeared in Milwaukee, Wis., in the person of Prof. Frederick C. Raeth, who with Kurtis R. Froedtert and William A. Biesmann, of Milwaukee, has perfected two different motor fuels, one using kerosene and the other denatured alcohol as a base.

Common kerosene and ordinary denatured alcohol, chemically treated by a secret process evolved by Prof. Raeth, form fuels which in tests on air and water-cooled motor car engines and on small stationary or farm engines prove to be at least as good, and in some ways much better than gasoline. Compared with gasoline, the kerosene fuel is more economical, not only from the standpoint of price, but also volume. The principal benefit claimed for the denatured alcohol fuel is the cost, as a greater given volume of the alcohol fuel is required to do the same work obtained from gasoline.

Treating Denatured Alcohol

Prof. Raeth and his associates pursued their investigation in the direction of treating denatured alcohol to make it suitable as a fuel for internal combustion engines with the idea of appealing particularly to Europe, where the denatured alcohol industry has made great strides under the influence of governmental inducements. A fuel that can be produced for 50 or 60 per cent less cost than gasoline is sold in European countries, and at the same time be derived from a theoretically inexhaustible supply of raw materials as compared with the rapidly dwindling supply of petroleum, will, it is figured, become the popular fuel for European motors.

The cost of fuel depends wholly upon the cost of the fuel, as the chemical treatment of Prof. Raeth adds but 3 to 5 cents per gallon. Given so strong an inducement to produce the alcohol in vast quantities as a market that can hardly be flooded, it is figured that producers of denatured alcohol in Europe, which includes practically every farmer, will make such production a vast business, and prices will be governed by the law of supply and demand.

A similar stimulation of the denatured alcohol industry in America might result, although this the Milwaukee inventor

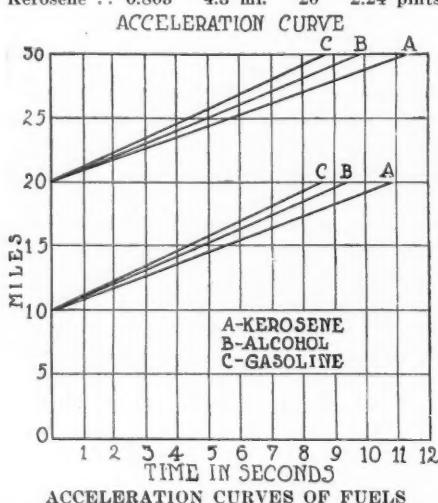


MEASURING NEW FUEL FOR TESTS

holds as not an immediate possibility, due to the infancy of denatured alcohol in the United States at this time. The kerosene fuel, although dependent upon the petroleum supply, can be sold several cents cheaper than the lowest grades of gasoline line now sell for.

Comparative tests of gasoline, the kerosene fuel and the denatured alcohol combination were made under the same conditions, and in point of fuel economy kerosene ranked first, gasoline second and alcohol third. The actual economy may be determined from the following table by figuring into the equation the present prices of each class of fuel:

Fuel.	Spec.	Grav.	Distance.	M.P.H.	Fuel Consumption.
Alcohol	0.835	4.3 mi.	20	5.28 pints	
Gasoline	0.70	4.3 mi.	20	3.36 pints	
Kerosene	0.805	4.3 mi.	20	2.24 pints	



Fuel Made from Kerosene More Economical than Ordinary Product

The test was made on an Auburn five-passenger touring car, carrying a four-cylinder Rutenber motor rated at 40 horsepower and equipped with a Rayfield carburetor hot-air jacketed. A course of 4.3 miles running through the city of Wauwatosa, Milwaukee county, was employed. This course provided practically every highway condition, including new macadam, dirt road, concrete road, and a steep grade with a bad railroad crossing at the bottom of the incline.

An ordinary aspirator bottle, with a capacity of about 1,750 cubic centimeters, and graduated up to 1,500 cubic centimeters by a scale pasted on the outer surface, was used as a container for the various fuels and a fair degree of accuracy in volume of measurement was thereby obtained. The bottle was connected

to the gasoline feed pipe of the carburetor by means of a rubber hose running through the floorboards, the container being held beside the driver. A split-second stopwatch was used. The gasoline tank feed pipe was disconnected and the line and float chamber drained dry. The rubber hose from the container was slipped over the end of the carburetor feed pipe and the motor was ready for the test.

Ease of Starting

The striking characteristic of the denatured alcohol fuel was the ease of starting the motor. The temperature at the time of the tests ranged between 57 and 63 degrees Fahrenheit. The car was run to the starting line, drained of gasoline and allowed to cool for about 10 minutes. The alcohol fuel was then introduced and the motor started at least as readily as with gasoline. It was immediately noticeable, however, that the motor was being starved, and the fuel adjustments, high- and low speed, of the carburetor were opened several turns, the air adjustment remaining untouched. The car was then run at a speed of 20 miles per hour over a distance of 4.3 miles, which required 5.28 pints of fuel. The container was replenished while the car was on the go. More difficulty was experienced in keeping the car at 20 miles per hour than with gasoline, the throttle feeling light and the motor seeming to take its load much more easily. Two tests were made with the alcohol fuel as above stated, and the results obtained were the same.

After the alcohol supply was shut off,

the container and line were cleaned with gasoline, the float chamber drained and gasoline introduced to remove any accumulation on the walls, and the motor operated on gasoline. It was stopped with a wide throttle and full dash adjustment to fill the cylinders with a rich mixture of gas, the kerosene was introduced as the alcohol had been previously, and the motor turned over. The motor started readily, but lagged after a few revolutions, when the gasoline vapor was exhausted. It was necessary to do considerable adjusting on both air and fuel valves of the carburetor in order to make the kerosene mixture run the motor anything like smoothly.

After the motor became hot, the sluggish action disappeared and the car was run 4.3 miles, over the same course as before, on 2.24 pints. The motor did not show the life and dash that was displayed by the alcohol fuel, nor did it approach the snappy action under gasoline until it had been run a considerable distance. The car climbed the hill with much less labor than on alcohol or gasoline. The kerosene used in the test was of the lowest grade that can be purchased and was obtained at a little corner grocery in the outskirts of Milwaukee. With the higher grades of kerosene, previous and following informal tests showed much better results.

Started on Gasoline

Each time that the motor was stopped in this test it was necessary to use gasoline to fill the cylinders before using the kerosene fuel. Attempts to start without reintroducing gasoline were futile, although encouragement to the inventor was given by spasmodic puffs while the engine was being cranked, indicating that his claims that better grades of kerosene will result in a fuel which can be used without necessitating a start on gasoline, are true.

Gasoline came out ahead in the acceleration tests. It required 8.5 seconds to accelerate the car from 10 to 20 miles per hour and 8.75 seconds to accelerate from 20 to 30 miles per hour on gasoline.

Alcohol ranked second, the 10-to-20-mile acceleration being accomplished in 9.5 seconds, and 20 to 30 miles, 10.5 seconds. On kerosene, it required 11 seconds from 10 to 20 miles and 11.5 from 20 to 30 miles.

The specific gravity of the kerosene used in the formal test was 0.805 or 43 degrees Beaume. The boiling point of this mixture was 112 degrees centigrade. As already explained, the kerosene was of very low grade. In other tests a better grade was used, testing from 45 to 48 degrees Beaume, with consequent lower flashing and boiling points. The alcohol fuel tested for specific gravity at 0.835 or 38 degrees Beaume, and had a boiling point of 67 degrees centigrade.

Neither of the two Raeth fuels has an offensive odor, as compared with gasoline. The chemical treatment makes the fluid less obnoxious, if anything, than in the natural state. At no time was smoke detected at the exhaust while the car was

running, and while the motor was idling, smoke came only while carburetor adjustments were being made. After the carburetor adjustment was satisfactory, no smoke was visible, indicating a complete combustion.

No immediate plans for the production and marketing of the new fuels have been

made by Prof. Raeth and his associates, Messrs. Froedtert and Biesmann. It is their intention to obtain opportunities for the most exhaustive tests. It has been proven to their own satisfaction that it is not a matter of carburetors, nor a matter of a certain design of motor, to utilize the Raeth fuels.

Claim America is Cyclecar Pioneer Bloods Made Small Machines in 1901

WHILE the cyclecar movement is new, and the result of a healthy growth of manufacturing possibilities, yet the machine itself is not so new as some might think. Except for refinement and a new public demand cyclecars are but little different in the idea sought from those produced by experimenter some years ago, though the working out of the ideas is today a much easier proposition now.

Among American makers Blood Bros. of Kalamazoo, Mich., claim to be possibly the first to manufacture cyclecars for sale in America—though the name cyclecar was unknown at that time. Whether the old Orient buckboard—which by a slight stretch of the imagination might be termed a cyclecar though lacking the very elements necessary to make it a success—antedated the machines built by the Bloods is not stated.

As early as 1901 this firm built a four-wheeled vehicle driven by a de Dion motorcycle motor having a single seat in back and a seat for a passenger in front. The rear rider was driver and turned the front axle and passenger to steer the car. This machine ran successfully, though motors of those days were most fearfully made. The little car weighed under 300 pounds. Its wheelbase was 45 inches, tread 30 inches, tires 1 1/4 by 28 Hartford single tube, and had a single speed forward and no reverse, though a clutch was fitted. This car did 3,000 miles in all before it was abandoned.

In 1903 this firm put out a new car commercially, making 100 of them, during

1903 and 1904 through the Michigan Automobile Co. of Kalamazoo. These were called the "Little Michigan" and it is claimed were sold in nearly every state in the union. After the second year the manufacture was dropped to make bigger cars in which there was, at the time, more money.

Specifications of First Cyclecar

The specifications of this machine were as follows: Tread 36 inches, wheelbase, 54 inches; tires, 2-inch by 28-inch, Dunlap clinchers; wheels, wire with steel rims; speeds, two forward and no reverse.

The speeds were had by two bicycle chains running on sprocket wheels of unequal size to a Brown-Lipe spur gear differential on the rear axle close up to one of the wheels. The engine was a 3 1/4 by 4-inch single, air-cooled, located under a bonnet behind the seat and was started from the seat by a crank. The machine weighed 450 pounds, sold at \$450 and would carry two persons at from 20 to 25 miles an hour all day long over ordinary country roads.

Adding to former experience Blood Bros. is to bring out a real cyclecar in the near future with all the latest ideas, according to the announcement.

A reputed pioneer in the cyclecar field, the latest product of the Blood Bros., will be watched with interest as they will combine the experience of a decade or more past with the latest developments as brought out by the manufacturers of cyclecars in England and on the continent.



BLOOD CYCLECAR OF THE VINTAGE OF 1903

Routes and Touring Information

In the Footsteps of the '49' ers—Part II

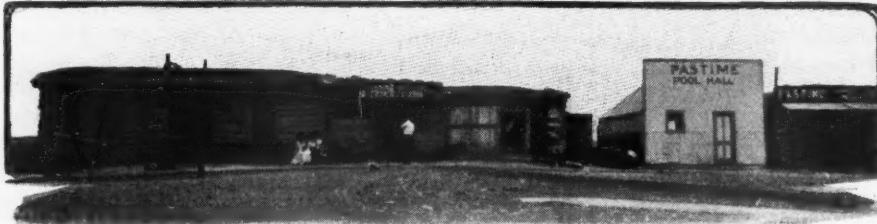
EARLY the next morning we left Glenwood Springs for Grand Junction, 100 miles away on our next lap to the Golden Gate. Just west of Glenwood we passed through South canyon, which although beautiful, does not rival in any way the Canyon of the Grand proper above Glenwood. The road is good through New Castle and Rifle, a prosperous town of about 1,800 people. Convicts were at work building roads under the honor system which has done so much for Colorado's highways.

Between the two latter towns the valley of the Grand widens out to several miles and most of the land is under irrigation. Fruits of all kinds and grains and alfalfa are raised. From Rifle on the road conditions got worse, the soil is dobe, and though short stretches had been worked, the most of it was rough. This lasted for a few miles and then we found an entirely new road which had just been completed, and replaced many miles of what formerly had been very rough going. We followed the railroad closely all the way to Grand Valley, 45 miles from the morning starting point. Above Grand Valley we encountered several arroyos or gulches into which the road dropped with steep pitches. After passing Una, 5 miles beyond, we crossed the river and plunged into the mountainous country generally referred to out there as mesas.

On the Mesas

The mesa country is very dry and vegetation is sparse, being mostly sagebrush and mesquite. The road on top of the mesa was rocky, winding and rough, with some steep pitches and sand. They told us there was game out here, but aside from a coyote or two slinking around a hill, we found nothing hunttable. The skull of an elk with its long branching horns started a collection of souvenirs, most of which were discarded before we reached the coast.

After 7 miles of this we dropped down off of the mesa over new roads on the edge of the dobe hills which would be impassable in wet weather. In fact we were told in Debeque, just below, that the road had to be rebuilt in spots after every one of the infrequent rains. Debeque is a town of a little over 1,000 population and



Cisco, Utah, with the log hotel in the middle

By Darwin S. Hatch

at the moment is being exploited as the center of a petroleum and gas field, both of these products having been found in paying quantities and of a superior quality. Oil wells are being sunk within a mile of the town, while a gas well is in full blast, daily spouting a geyser charged with gas, naphtha and other petroleum products, sometimes to a height of 200 feet. When lighted, this immense column presents a beautiful spectacle. The resources of the town are practically undeveloped at this time.

Back over the mesa for 25 miles brought us to its edge and we dropped down into the valley of Pateau creek and entered the famous Palisades. The formations of sandstone assume every imaginable shape. The giant cliffs, worn by the erosion of the waters of thousands of years, present ever-changing pictures—grotesque carica-

Negotiating an arroyo in the Utah desert



tures of faces, ruined castles and turreted Moorish palaces, chimney rocks and innumerable other forms.

The Speed Demon, as he instinctively dodged the sight of a rock balanced precariously on a needle point, which threatened to crush us at a breath of wind, was minded to quote.

"Where fancy a thousand wondrous forms descries,
More wildly great than ever pencil drew."

The road through the Palisades is very good, winding around the base of the carven cliffs and detouring to avoid the massive rocks which have fallen. Though wonderful, the country is desolate.

The Valley of the Grand

Thirty miles of the Palisades brought us out of the waste into the midst of one of the greatest fruit countries of the world, of which Grand Junction is the center. Our first announcement of the approach of the fertile district was when the road ran under numerous great flumes which conducted the water for irrigation from many miles up the valley. Shortly after we entered the town of Palisades, and from there the 15 miles to Grand Junction was a continuous panorama of fruit orchards and vineyards, with the houses on the ranches so close together that it seemed one long country village.

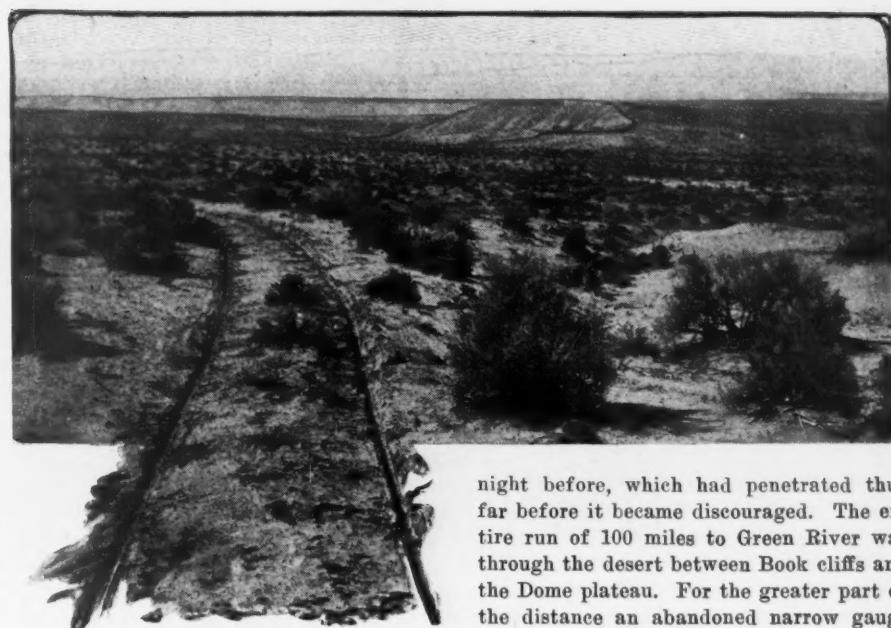
Grand Junction is the metropolis of the western slope, the largest town between

Denver and Salt Lake City, and because of its geographical and railroad advantages always will be the commercial center for a large and rapidly developing territory. It is at the junction of the Grand and Gunnison rivers and of the Denver & Rio Grande and the Colorado Midland railroads. It has a population of about 10,000. Aside from the fruit shipments, the chief industries are a beet sugar factory which slices 500 tons of beets a day, a large copper smelter and much undeveloped coal country. Peaches are the product that made the Grand valley famous.

Prosperity is the rule in this lower end of the valley and consequently motoring is pretty well represented. There are about 200 cars owned in Grand Junction and a like number in the fruit ranches in the neighborhood. The people are the greatest boosters for motor cars and good roads of any we met. Grand Junction is the birthplace of the Midland trail movement and the local branch of the Midland Trail Association is the most aggressive of any. There also is a rapidly growing motor club which works hand in hand with the Chamber of Commerce. Fuel is comparatively low in price, gasoline selling for \$.30 and kerosene for \$.20.

Roads Dragged After Rain

During the night at Grand Junction it rained hard for 4 hours, much to the surprise of the natives, who stated that it was the first rain in 6 months. This made the first part of our day's run to Green River, Utah, more trying than was expected. For 11 miles northwestward we encountered clay roads which would have been boulevards in dry weather, but which had been made very slippery by the rain. All the way to Fruita the road was lined with the fruit orchards and crossed by irrigation ditches. Between Fruita and Loma the roads became sandy and the orchards interspersed with grain, alfalfa and hay fields. The ranchers were out dragging the roads, which is done after every rain and keeps them in fine condition. Beyond Loma, the country began to get less productive and the ranches more scarce until we reached the town of Mack, a little railroad station 24 miles out which, though in Colorado, is on the edge of the desert country of Utah. Within the limits of the town we found a bad mud hole in the slippery



IN MESA LAND

*In Mesa Land the sand dunes stretch afar,
The rattler basks unhindered in the sun,
And there are battlements that hint of war,
And, in the gorges, sullen rivers run.*

*Aye, there are battlements, from whose high
walls
A Front Je Beuf might send his challenge
down,
But silence reigns, and no portcullis falls—
Unbroken is the desert's somber frown.*

*In Mesa Land the cloud-ships 'gaist the
blue,
Are white as any sail viewed from the
strand,
And all the peace of years envelops you
In Mesa Land.*

—Arthur Chapman.

gumbo road and almost mired down. No sooner had we crossed the town limits than we found ourselves in the desert country. Our introduction to it brought out strikingly the conditions that will have to be overcome if a good road is to be built through the desert. Just out of Mack we came to a deep arroyo or gully with steep sides, so the road, which had diminished to a mere trail, took advantage of the Denver & Rio Grande tracks, scrambled up on the railroad grade and crossed on the ties. It may be well to state here that the trail follows the D. & R. G. roughly all the way to Price, some 260 miles. During the first half of the distance it never gets more than 10 or 15 miles from the railroad, though it may not be in sight for 30 miles or more. Along the railroad there are frequent water tanks, so that no one need fear actual danger from thirst during this part of the trip, especially as all trains are required by law to stop on signal in the desert.

When the arroyo had successfully been negotiated on the ties we slipped down to earth and found ourselves in a winding trail through scrubby sage and greasewood. The sand in spots was very deep, but not unnavigable, thanks to the rain of the

night before, which had penetrated thus far before it became discouraged. The entire run of 100 miles to Green River was through the desert between Book cliffs and the Dome plateau. For the greater part of the distance an abandoned narrow gauge grade of the D. & R. B. was utilized as the roadbed. It had not been rained on since the winter before and was very soft sand and gumbo, but level. The bridges and culverts have burned or rotted out and to cross the arroyas, gullies and gulches which break the grade every few hundred yards, the trail left the grade and wound among the sand hills and around sandstone cliffs until a spot was found where the descent into the arroyo could be made.

Traversed an Abandoned Grade

At the bottom the dry bed of the stream was followed until a favorable point for an ascent was encountered. At times the trail would leave the railroad grade for perhaps 5 miles and wind among the bare red hills, only to return to the grade at some other point. The roadbed on this grade is quite narrow, rarely with room for two cars to pass, and if the wheels get within 6 inches of the edge the soft dirt lets them slip down. This we found out by bitter experience, for both right wheels slipped off the grade suddenly and tipped at an alarming angle, but did not turn over. However, the Scrivener found himself seated in sagebrush at the bottom of the grade.

As desolate and lifeless a region as can be imagined is the desert. There are no houses and no signs of human life except when the trail winds back to a water tank



"Slipped off the grade at an alarming angle"



"We pitched camp for the night"



Climbing one of the innumerable ridges of sand and rocks in the desert

on the railroad about every 50 miles. There is no water, except at these tanks and occasional water holes, perhaps 75 miles apart. Blinding sand storms spring up without apparent warning and the heat is terrific, though on account of the dryness of the atmosphere it is not oppressive. The thermometer will register 105 degrees in the shade and in the sun it is beyond the capacity of a 125-degree thermometer to tell.

In spite of its desolateness, it is a wildly beautiful country. In the distance are the bare sandstone cliffs and ridges in brilliant reds, yellows and white, or the black outcropping of coal or lava. Red and white sand, sparse sage brush, mesquite, alkali deposits, prairie dogs and rattlers, with a buzzard or two or a black eagle overhead are the sum total of the immediate scenery.

In the Utah Desert

Contrary to what we expected to find, the desert is not level, but is a series of sinks or lowlands surrounded by cliffs and ranges of bare hills of sand and rocks. At almost any time on one hand or the other can be seen mirages picturing a cool lake out of which the bare cliffs rise like islands, and take on a semblance of softness from the fancied water that laves their bases. We found the mirages more responsible for thirst than were the heat and dust, as a view of these ever-receding ghost-lakes made us resort to our vacuum bottles and water bags frequently.

At noon we reached Cisco, a little settlement surrounding a water tank on the D. & R. G. and consisting of a saloon, a pool hall, a three-room log hotel and four shack houses. This is the first water and the first sight of the railroad since leaving Mack, just 40 miles away. The noon meal at the hotel made up in quantity for what it lacked in quality, and after refilling the water bags, resumed our journey. Sixteen

miles further there is another watering place. This is at Sager, merely a water tank on the railroad. The next humanity and water is at Thompson's ranch, likewise a water tank on the railroad 35 miles to the east of Green River. There is a store here where canned goods and dried meats may be obtained.

Dry Rain Proves Wet

Just as we were leaving Thompson's the sky overclouded suddenly and threatened a downpour of rain. The natives laughed at us, stating that it had not rained during July in 30 years and that there had not been a drop of rain in the last 6 months. They said that this would be a "dry rain." That, though the water might fall from the clouds, very little of it would reach the ground, being evaporated almost before it touched. We experienced several of these "dry rains" later, but this one proved to be a very wet rain, for before we had gone 1 mile out of the settlement there was a veritable cloudburst and in a few minutes we found the arroyos were turning into rushing streams. However, we decided to push on to the Green River, only 35 miles away, as the accommodations at Thompson's seemed limited. Within a half hour we forded an arroyo through 3 feet of water, by getting out the tow rope and doing a lot of pulling. When we had gone 100 yards further, we found the next arroyo a rushing torrent too deep to ford.

So we decided to turn back and try for Thompson's. Luckily the water was no higher in the gulch we had just crossed and we got back the same way, though the patches of dobe and alkali were getting almost too soft for traction. After 2 hours' work we got back to Thompson's just about dark, covered with mud and wet to the skin. By this time the rain had stopped and we pitched camp for the night.

By morning the trail had dried up and the water was gone from the arroyos so

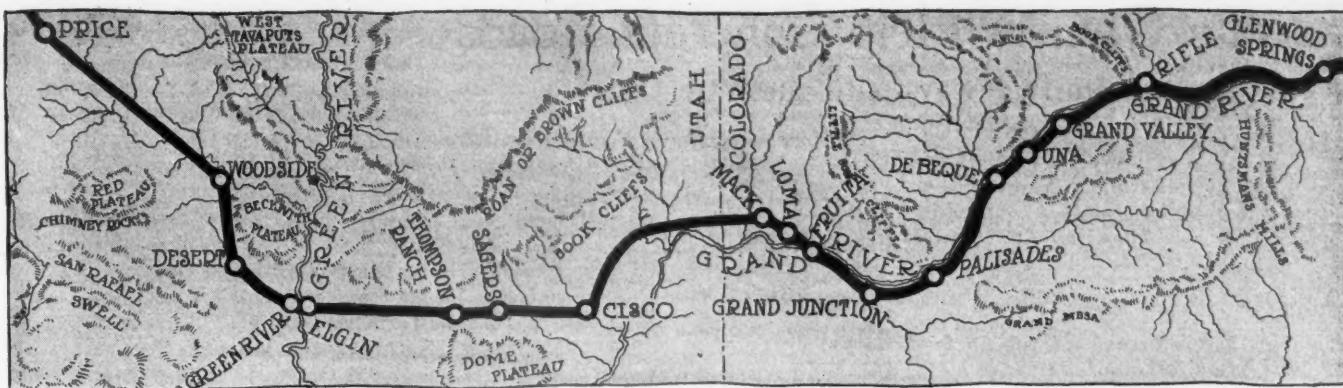
that we made reasonably good time into Green River. This town is in a valley some 12 miles in length and a few miles in width along the Green River. Fruit raising is the chief industry, although a growing one is the mining of ore from which radium is obtained. Gasoline is 35 cents and kerosene 25 cents. On the other side of the river is the town of Elgin.

Woodside's Boiling Well

The first water point beyond Green River, which means the first habitation of man, is the town of Desert, 13 miles to the west. This is simply a station and water tank on the railroad, a general store and the station itself being the only buildings. The water supplying the tank is pumped 5 miles from the Green river. The next water is at Woodside, likewise on the D. & R. G. It has six houses and is 12 miles further on. It has a hot artesian well from which the water boils over every 3 minutes, spouting up to a distance of 5 feet above an 18-inch pipe. It then subsides and for 3 minutes a menacing rumble and hot gases are the only evidences of activity. The well is 3,200 feet deep, and was tapped by the railroad company, which abandoned it when the boiling water proved unfit either for drinking or for the locomotive boilers on account of the mineral impurities it contains. There is plenty of sweet water most of the time in the Price river at the edge of the town. This must be forded, however, and with caution, for if the direct line across the river is missed, the car will mire down in quicksand.

Twenty-five miles beyond Woodside is Big Spring ranch, which owes its existence, as its name, to a natural spring which is used for irrigation. The rancher has reclaimed possibly 60 acres of desert upon which he raises fruits and alfalfa. Some 22 miles further is a small town called Wellington, on the Price river. The valley of the Price river here is called Castle valley and is hemmed in between the eastern range of the Wasatch mountains, the Red plateau and the Tavaputs plateau. The land along the river is under irrigation and raising fruits, alfalfa and desert hay in profusion. A monster irrigation project is under way to reclaim a much greater acreage.

Here the rough, poor desert trails suddenly gave way to good country roads that led us into Price, a town of 5,000 people, with a business district and public buildings that would do credit to a city ten times its size. Almost wholly a Mormon settlement, it is so much so that the city hall is employed as the place of worship of the Latter Day Saints, while the new \$60,000 tabernacle is under construction. The town's prosperity is due to the fact that it is the supply for a territory 100 miles in radius. The original industries are sheep and cattle ranching, but a newer and rapidly developing industry is coal mining. In the Wasatch mountains within 20 miles



Route of Motoring Musketeers from Glenwood Springs, Colo., to Price, Utah

of the town are sixteen coal mines producing 10,000 tons of bituminous coal daily, and employing 10,000 miners. Pitchblende ore in the neighborhood is turning out 18 milligrams of radium to the ton.

Northward out of Price on our 126-mile

run to Salt Lake City the next day, a fair road led along the tracks of the D. & R. G. past numerous coal mining camps and entered Price canyon at 10 miles from the city.

(To be continued.)

At Renick you will turn west on the through route to Kansas City which will take you through Higbee, Armstrong, Glasgow, Slater, Marshall, Blackburn, Higginsville, Mayview, Odessa, Grain Valley, Independence, covering 155 m.; Kansas City to St. Joseph, 84 m., via Wallula P. O., Leavenworth, Lowemont, Atchison, Lake Sta.; St. Joseph to Elmo, 68 m., via Savannah, Maryville and Burlington Junction.

Wilmington, O.-Fredericksburg, Va.

Wilmington, O.—Editor Motor Age—Please give best route and condition of roads from Wilmington, O., to Fredericksburg, Va.—Karl Sprague.

Although not the shorter, your better route will be via Washington Court House and Harrisburg to Columbus, 38 m.; Columbus to Wheeling, 148 m., via Columbia Center, Granville, Newark, Hanover, Frazeysburg, Trinway, Adam's Mills, Coshocton, Newcomerstown, Port Washington, Uhrichsville, Lacyville, Cadiz, Harrisville, Colrain. The route from Wheeling to Washington, D. C., you will find outlined in Motor Age of June 26 in the communication headed Wheeling, W. Va.-Washington, D. C. From the latter point to Fredericksburg you will continue via Occoquan and Stafford.

Richmond, Ky.-Logan, W. Va.

Richmond, Ky.—Editor Motor Age—Kindly give best route from Richmond, Ky., to Logan, W. Va., that is if there is one; also give route from Huntington, W. Va., to Logan, W. Va.—John Kennedy.

Going to Lexington from Richmond, then to Maysville via Paris, Millersburg, Fairview and Washington; proceed to Portsmouth via Winchester, Blue Creek, Henley and Bertha; from Portsmouth to Huntington via Sciotoville, Gervals, Ironton and Sheridan, and from Huntington you may be able to follow the line of the railroad to Logan, but we are unable to give you routing as the roads in West Virginia are so poor they are not charted for motor cars.

Answers to Route Inquiries From Motor Age Readers

Louisville, Ky.-Toronto, Ont.

LOUISVILLE, KY.—Editor Motor Age—Please publish the route from Louisville to Toronto, through Cleveland, not the shortest route but the best roads.—Arthur E. Hopkins

A fine gravel road to Springfield, 71 m., is via Sharon, Lebanon, Waynesville, Spring Valley, Xenia, Yellow Springs; Springfield to Marion, 63 m., with good gravel or stone all the way, via Mechanicsburg, Marysville, Prospect. The route from Marion to Buffalo is outlined in the Marion, O.-Rochester, N. Y., communication in the issue of Aug. 21. From Buffalo to Niagara Falls is over a new 26-mile boulevard, leaving Buffalo on Main street and passing through St. Johnsbury. Crossing into Niagara Falls, Can., a run of 50 m. brings you to Hamilton via St. David, St. Catherines and Gimsby. Toronto is 47 m. beyond, reached via Trafalgar and Lambton Mills.

A description of your car should be left at the American Customs House and after crossing into Canada an Ontario license, costing \$4, must be purchased, and a 7-day permit obtained unless you anticipate remaining in the Province a longer time, in which case it is necessary to procure a customs bond, costing \$5, either from customs brokers on the American side, or from the Guarantee Co. of North America, 111 Broadway, New York.

Volumes 4 and 5 of the Blue Book cover this route in detail.

Caruthersville, Mo.-Kissimmee, Fla.

Caruthersville, Mo.—Editor Motor Age—Kindly route me from Memphis to Tuscaloosa, 160 m., via Germantown, Colliersville, Moscow, LaGrange, Grand Junction, Saulsbury, Essary Springs, Corinth, Burnsville, Iuka, Cherokee, Barton; Tuscaloosa to Huntsville, 68 m., via Leighton, Town Creek, Courtland, Wheeler, Hillsboro, Trinity, Decatur, Belle Mina, Madison; Huntsville to Birmingham, about 100 m., via Farley, New Hope, Guntersville, Brooksville, Oneonta, Village Springs; Birmingham to Atlanta, 180 m., via Irondale, Trussville, Argo, Springville, Ashville, Steele, Attalla, Gadsden, Center, Cave Spring, Cedartown, Rockmart, Cartersville, Marietta; Atlanta to Macon, 146 m., via Decatur, Ingleside, Stone Mountain, Redman, Lathonia, Covington, Social Circle, Rutledge, Eatonton, Milledgeville; Macon to Valdosta, 150 m., Echeconnee, Henderson, Vienna, Cordele, Sibley, Ashburn, Chula, Sparks, Mineola; Valdosta to Jacksonville, 142 m., via Madison, Lee, Ellaville, Falmouth, Live Oak, Wellborn, Lake City, Olustee, Sanderson, McClellan; Jacksonville to Kissimmee, 176 m., via St. Augustine, Smith's, Bulow, Ormond, Daytona, DeLand, Orange City, Enterprise P. O., Osteen, Sanford, Longwood, Maitland, Orlando and Pine Castle.

The length of time to be spent on this trip would depend upon individual taste and incli-

nation, as there is much beautiful scenery and many points of interest to be found enroute. Doubtless some time would be spent in the larger cities such as Birmingham, Atlanta, Macon and Jacksonville.

Moberly, Mo.-St. Paul, Minn.

Columbia, Mo.—Editor Motor Age—Please give me the best route from Moberly, Mo., to St. Paul, Minn.—L. D. Boss.

Running to Quincy, a distance of 123 m., via Renick, Centralia, Mexico, Laddonia, Hutchinson, New London, Hannibal, Marblehead; thence up the valley from Quincy to Burlington, 79 m., via Ursa, Sutter, Keokuk, Fort Madison; Burlington to Davenport, 81 m., via Newport, Wapello, Grand View, Muscatine and Blue Grass; Davenport to Dubuque, 79 m., via Eldridge, DeWitt, Delmars, Maquoketa, Fulton, Lamotte; Dubuque to La Crosse, 168 m., via Farley, Dyersville, Colesburg, National, McGregor, Prairie du Chien, Mt. Sterling, Viroqua, Portland, St. Joseph; La Crosse to St. Paul, 162 m., via Ridgeway, Winona, Lewiston, St. Charles, Rochester, Pine Island, Zumbrota, Cannon Falls, Westcott.

Moberly, Mo.-Elmo, Mo.

Clark, Mo.—Editor Motor Age—Please give me the best route from Moberly, Mo., to Elmo, Mo.—W. E. Brown.



Typical approach to hills in the Utah desert

Private Owners Help Concrete Roads

Lincoln Highway Certificates Are Out

DETROIT, Mich., Aug. 23—The Lincoln Highway Association, the object of which is "to immediately promote and procure the establishment of a continuous improved highway from the Atlantic to the Pacific, open to lawful traffic of all descriptions without toll charges," besides seeking contributions from motor car manufacturers, has instituted a campaign for obtaining small subscriptions from individuals. They are solicited for a contribution of \$5, for which a certificate, a facsimile of which is herewith shown, is issued.

Motorists Willing Subscribers

A. R. Pardington, secretary of the association, stated today that this scheme for augmenting the pledges of the manufacturers is meeting with unqualified success. The certificates are being sent to motor car dealers all over the country, who are agreeing to dispose of certain quantities. The Packard Motor Car Co. has gone a step further in sending a supply of them to each of its representatives throughout the country. Other manufacturers no doubt will follow this lead.

That the certificate plan is going strong is evidenced from the fact that motor clubs are requesting certain numbers of them and practically have pledged themselves to dispose of them among their members. The Hoosier Club of Indianapolis has requested 400, the Rochester, N. Y., Automobile Club has asked for 500, and the Cleveland motor car organization has applied for an equal number. These are but a few of the many examples of the way motor organizations everywhere are responding to the project. Secretary Pardington states that within a few months it is expected that fully 100,000 certificates will have been disposed of.

Pays \$1,000 for Certificate

But not all of these are purchased at the minimum price of \$5. There is a great deal of sentiment connected with them. One woman in Maine, for instance, paid \$1,000 for hers so that she might have certificate No. 2, while another subscriber read of the plan and immediately sent his check to the national headquarters for \$500, requesting a certain certificate number. No. 1 went to Henry B. Joy, president of the association.

The good roads committee of the Automobile Chamber of Commerce has recognized the immense value of such a continuous transcontinental roadway to the motor industry as well as to the country at large, and has taken a farsighted view of the existing need for it. The findings of this committee as voiced in the communication from Roy D. Chapin, its chairman, are well worth the consideration of every firm and industry allied with or

dependent upon the motor industry. The committee's report follows:

After several months of investigation, your good roads committee feels that it can now report favorably on the ocean-to-ocean highway project. This plan is so comprehensive that it merited very thorough investigation on our part. We have had numerous conferences with Mr. Fisher and several discussions at the meetings of the executive committee of the association. Our conclusion is that if this ocean-to-ocean highway plan can be put through it will immediately stimulate a widespread construction of good roads throughout the country.

We feel certain that whatever route may be finally selected, two other transcontinental highways would follow shortly afterwards, since the people on the other routes will not permit the original road to monopolize all the touring. We believe that connecting links to this ocean-to-ocean highway would be built north and south across the country, and its quick construction will serve as an example to the western states in highway building that will accelerate road construction immensely where none is going forward today.

Our analysis has made us believe that, entirely outside of the state and national aid campaigns which we are carrying on, and will continue to carry on, the Ocean-to-Ocean highway plan proposed by Mr. Fisher is feasible, and one meriting the co-operation of all interests benefited. While the sum to be paid seems large, its payment may be spread over three to five years. If the whole fund of \$10,000,000 is not raised, the contribution is not binding, therefore no money will be asked for unless sufficient is raised to make the road an absolute certainty.

You will shortly hear from the Ocean-to-Ocean highway committee direct, when it will explain to you more fully the whole plan. If our committee can give you any further information, I will be glad to answer any letters on the subject. Very truly yours.—R. D. Chapin, chairman good roads committee, Automobile Chamber of Commerce.

MAKE SCHEDULE FOR PARK TOUR

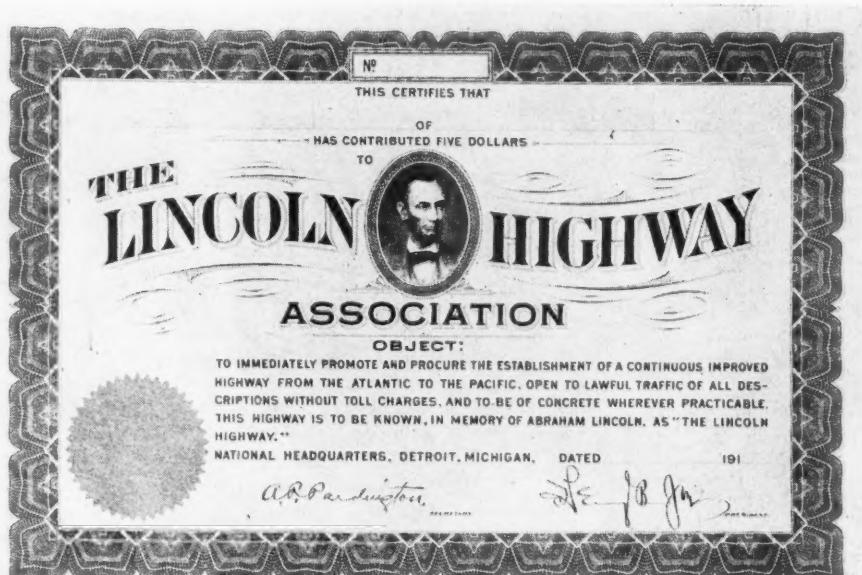
Washington, D. C., Aug. 23—The secretary of the interior today instructed Maj. Wm. T. Littebrant, acting superintendent of the Yosemite national park, to open the Coulterville road to motor car tourist travel. The road is to be opened to the public generally and not to any particular machine or concern.

The department has prepared a set of

regulations governing the movement of cars in the park. They provide that machines will be permitted to enter and leave the park by way of the Coulterville and Big Oak Flat roads only; approaching Yosemite valley, they will be restricted to the road on the north bank of the Merced river. The use of the roads mentioned is allowed only for the purpose of ingress and egress. Cars coming into the park may leave the Merced Grove of Big Trees between 10 a. m. and 1 p. m. and between 4 p. m. and 5:30 p. m. Outward-bound cars must leave Yosemite village between 6 and 7:30 in the morning. Machines are restricted to a speed of approximately 10 miles an hour in the rolling mountain country, to 5 miles an hour on the steep descent to the foot of the Coulterville road, to 15 miles an hour between the old blacksmith shop and Cascade creek, to 10 miles an hour between Cascade creek and Pohono bridge and to 15 miles per hour between Pohono bridge and Yosemite station.

East-bound, no car will be permitted to cover the distance from Merced grove to Cascade creek in less than 1 hour and 17 minutes, or from Cascade creek to Yosemite village in less than 37 minutes, making the minimum time of passage from Merced grove to Yosemite village 1 hour and 54 minutes. West-bound, no car will be permitted to cover the distance from Yosemite station to Cascade creek in less than 35 minutes, or from Cascade creek to Merced grove in less than 1 hour and 16 minutes, making the minimum time from Yosemite to Merced grove 1 hour and 57 minutes.

On entering the park at the Merced grove, each car will be given a ticket of passage, on which will be stamped the time of starting from the Merced grove. This ticket must be shown to the ranger at Cascade creek, who will stamp on it the time the car passed his station. The



CERTIFICATE FOR PRIVATE CONTRIBUTORS TO LINCOLN HIGHWAY FUND

ticket will again be stamped with the time of arrival at Yosemite village. Similar procedure will be observed with reference to cars bound out of the valley. If the time stamped shows that the car has exceeded the maximum speed, the offender will be obliged to park his machine immediately and leave the reservation at the next regular time set for the passage of motor cars.

A license fee of \$5 must be paid for the round trip and no motorcycles will be allowed.

QUAKERS IN GOOD ROAD CAMPAIGN

Harrisburg, Pa., Aug. 23—More legislation bearing directly upon improvements of roads was passed at the recent session of the Pennsylvania legislature than in any session which created the state highway department, and it also supplemented the acts of the session of 1911 in a number of ways. A summary of the bills passed, most of which have not yet been acted upon by the governor, shows that Pennsylvania has taken an advanced position in regard to highway development and that with the approval of the people of the proposed \$50,000,000 bond issue amendment to the constitution the Keystone state will be fairly started on its way back to a high place in the matter of roads.

In addition to complying with the requirements necessary to send the proposed bond issue before the people the legislature passed an act providing that the question should be submitted at the November election. When the bond issue is approved it will be required to pass acts regulating the issuance of bonds, fixing the portions in which they shall be sold, the rate of interest and the sinking fund requirements.

Other bills bearing upon roads which have been passed include:

Jones-Gibson township road act, placing all township roads, estimated at over 75,000 miles, under state supervision and requiring systematic repairs and maintenance and keeping of accounts.

Bill adding seventy-six new road routes to the Sprout main highway act of 1911, total length of new routes estimated at 1,000 miles to be taken over on June 1, 1915.

Bill changing about thirty-five routes in act of 1911.

Bill enabling state highway commissioner to build spurs to main highways.

Bill permitting state highway commissioner to receive money for state aid on state routes, thus enabling him to build more miles of roads in localities which raise funds for the purpose.

Bill allowing boroughs to connect with main highways outside their corporate limits.

Bill permitting counties to join with boroughs in improving borough streets and to connect with main highways.

Bill providing method for adjusting disputes over road tax in second class townships.

Appropriating \$1,000,000 for deficiency in road tax bonus for 1912.

Appropriating \$2,500,000 for aid in building and maintaining township roads for 1913 and 1914.

Authorizing formation of county organizations of supervisors.

In addition the general appropriation bill carries these major items for highway work by the state highway department: Construction and repair of state highways and payment of state's share in maintaining and repairing state-aid roads, \$3,600,000; maintenance of improved and unimproved state highways, \$1,900,000; permanent improvement of state-aid highways, \$1,000,000; reconstruction of highways which may be damaged by floods, cloudbursts or catastrophes, \$100,000; acquiring turnpike roads, \$200,000.

Philadelphia, Pa., Aug. 24—"On to Harrisburg" is the slogan of the motor car

owners and dealers of Pennsylvania in a state-wide campaign that is to be formally launched next month by the Pennsylvania Motor Federation to secure approval of a \$50,000,000 loan amendment for the repair and improvement of the state highways.

A systematic and thorough campaign is planned, it being the purpose of the projectors to enlist the aid of not only motorists but to secure the support of horsemen, farmers and everyone directly or indirectly interested in good roads.

Joseph H. Weeks, president of the Delaware County Automobile Club and chairman of the federation's good roads committee, will supervise the campaign from this city, and the Philadelphia Automobile Trade Association, the Quaker City Motor Club, Automobile Club of Philadelphia, Automobile Club of Germantown and the Delaware County Automobile Club will send delegations to Harrisburg. In the meantime meetings will be held in all parts of the state and addressed by prominent speakers to arouse enthusiasm for the project.

WISCONSIN ROAD WORK

Madison, Wis., Aug. 23—The most significant manifestation of the growth of the good roads movement in Wisconsin is the fact that so far in 1913, under the provision of a law enacted by the Wisconsin legislature of 1913, more than \$125,000 has been subscribed by individuals, mostly residents of cities, for the permanent improvement of country roads, according to the Wisconsin state highway commission.

Out of this \$125,000 raised by private subscription, there will result \$750,000 worth of road building in 1914, as the law

provides that when funds are thus raised by subscription, the local authorities shall raise a like sum, and the county and the state then add a sum equal to the two. For example, the Kenosha Automobile Club, Kenosha, raised \$16,000 for road work in designated townships. The towns must raise \$16,000, then the county must contribute \$32,000 and the state adds another \$32,000, or a total of \$96,000 to be devoted to permanent highway improvement in Kenosha county next year. None of the money, however, can be used within the limits of any city or village, but must be used in the country districts.

The highway commission also reports that during 1913 there are being built 1,030 miles of permanent roads, of which 350 miles is water-bound macadam; 600 miles of gravel road; 30 miles of concrete, and 50 miles of slate, granite chip, bituminous macadam and other materials than those mentioned above. The 30 miles of concrete road are being built entirely within the county of Milwaukee. Last year about 10 miles of concrete road were built in Milwaukee county, but by the contract system, and part of the roads were rebuilt this year. Now the county of Milwaukee is doing the work itself.

PLANT GOES TO BENTON HARBOR

Benton Harbor, Mich., Aug. 24—The city has given the Bremer-Wilson Mfg. Co. a factory site and is erecting two buildings, the main one 60 by 100 and the bronze foundry 25 by 60. The company handles several motor accessories such as the Triplex Ford starter, Triplex gas saver, Ford housing pulley and Triplex bow fastener. MFRS COM

New Good Roads Bill Before Congress

National Survey of Highways a Feature

WASHINGTON, D. C., Aug. 23—In order to encourage and systemize good road development in and between the several states and to equalize the burdens thereof, Congressman Hobson, of Georgia, has introduced a bill in congress that contains a number of good features. It provides, in effect, that the director of the office of public roads be authorized to make and maintain a general survey of interstate highways, locating the natural trunk lines and branches, said survey to include general plans giving the type and estimate of cost of construction and improvement of each highway and its subdivisions, and to make a detailed survey of post roads and rural free delivery routes in the country districts.

The bill further provides that the director of the office of public roads be authorized to co-operate with the highway authorities of any state in making a detailed survey of the roads of any state or any subdivision thereof of any road therein, this survey to include estimates of cost for improving and maintaining these roads,

provided the amount expended by the director on any such survey shall not exceed one-half of the total cost of the survey.

Whenever any state or subdivision thereof, or any road district, shall authorize the improvement of any post road or any interstate road or any section or subdivision of same in carrying out the provisions of a survey and approved by the secretary of agriculture, then the said secretary is authorized to pay one-half of the total cost of such improvements, payments to be made at such times and under such regulations as the secretary may prescribe. The provision is made that before making any payment the secretary shall be satisfied that after the completion of said improvement the road will be maintained by state or local authorities, or by both, in a proper condition of repair.

The newly-created house committee on roads has the bill under consideration and Congressman Hobson has announced his intention of trying to secure the enactment of the bill.

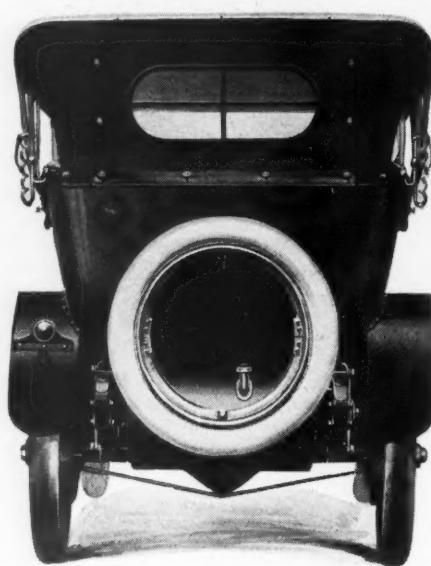
Marion Enters Six-Cylinder Ranks

ATEST among the sixes to appear on the market is the new Marion six. The conversion of this company to the six-cylinder field was announced in these pages last week, and the details of the new car, which is the first six-cylinder product of the Indianapolis company, are now at hand. The new car is known as the Marion G and comes in four body types, fitted to the same chassis. These body types are a five-passenger touring and a two-passenger roadster at \$2,150. Also, there are a four-passenger coupe and a five-passenger sedan.

Marketed by New Organization

The new six is being marketed by the newly organized J. I. Handley Co., Indianapolis, Ind., distributing agent for the Marion Motor Car Co. and the American Motors Co., which two hoosier concerns are closely affiliated. Aside from its price, which is exceptionally low for six-cylinder productions, the car is distinguished by the effort that has been made toward adapting it to the requirements of family use.

The six cylinders of the motor are of the L-head type and are cast in threes. The cylinders have a bore of $3\frac{3}{4}$ inches and a stroke of $4\frac{1}{4}$ inches, putting it in what usually is termed the long-stroke class. It has a catalog horsepower rating of 50, and it has shown 54 horsepower at 2,000 r.p.m. on the block, according to the maker. Intake and exhaust valves are on the right side of the motor and the valves are inclosed by two quickly removable plates, each of which expose the valves of three cylinders. The timing gears have spiral teeth but the shaft driving the pump first and then the electric generator is operated from the crankshaft through a silent chain. Water is circulated in large



Rear of Marion six touring car, showing dummy felloe for carrying spare tire

FEATURES OF MARION SIX

Cylinders, $3\frac{3}{4}$ by $5\frac{1}{4}$ inches cast in threes

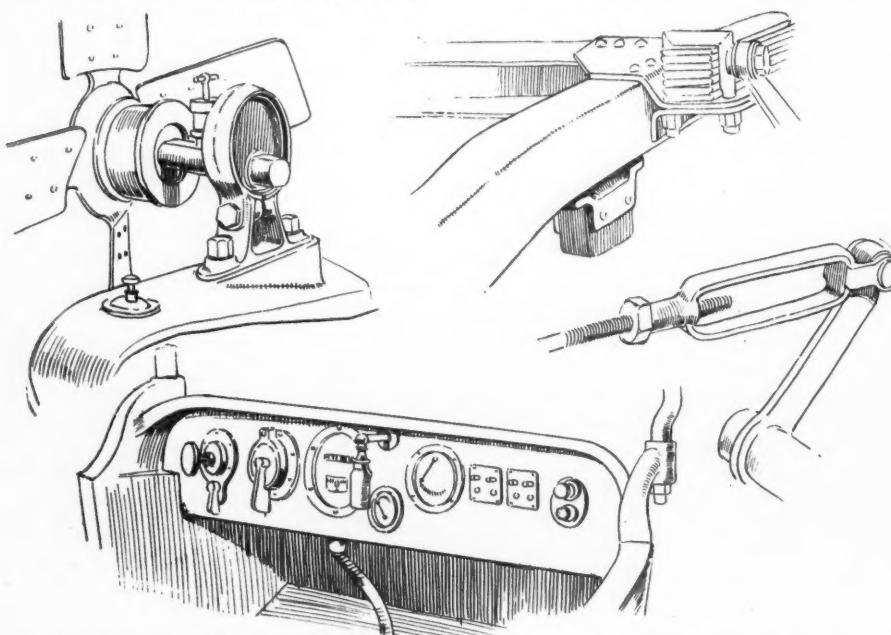
Cone clutch dropped in favor of dry disk

Self-oiling spring shackles

Left instead of right drive
Spare tire carried on dummy felloe at rear

Price, \$2,150

waterjackets around the combustion chambers and valves by centrifugal pump, and the draft of air through the honeycomb radiator is assisted by a pressed steel fan. The adjustment of the fan for slack in the fan belt is through an eccentric mount-



Among the features of the new Marion six is the eccentric fan pulley adjustment, the rubber bumper under the frame and the turnbuckle on the brake rod for adjustment. The lower sketch shows the arrangement of instruments and controls on the dash coil.

ing which permits the fan-bearing center to be moved farther away from or closer to the pulley on the camshaft. Exhaust gas is led from the exhaust manifold to the muffler through flexible tubing.

One of the outward distinguishing features of the new Marion is the arrangement of the manifolds. In each of the triple-cylinder castings, the intake ports are siamesed so that the gas is led into the block between the last two cylinders of each casting. This arrangement permits the use of a very simple Y-shaped manifold. The exhaust passages to the manifold are individual and on almost the same level as the inlet piping. Short branches to the main portion of the exhaust manifold extend upward so that the header is above. This provides a compact assembly and shows careful design of the gas passages.

Breather Pipe Eliminated

A novel feature in connection with the lubricating system which is a combination of pressure feed to the three main bearings and automatic level splash is the elimination of the conventional breather pipe. The crankcase compression escapes through openings directly into the valve mechanism pockets in the cylinder castings carrying with it an oil mist that thoroughly lubricates this mechanism. Breather holes in the valve cover plates relieve the pressure in these pockets, so that in reality this arrangement simply means utilization of the oil that formerly was wasted by being carried off through the exit direct from the crankcase to the open air.

Chief among the features of the ignition system is the use of a special type of adjustable coupling in the shaft between the armature of the magneto and the driving gear. This is arranged so that the spark timing may be altered through a range of 2 degrees without having to reset the gears.

Ignition is by Splitdorf magneto and the carburetion by a Rayfield carburetor with a hot-air pipe to assist in vaporizing the lower grades of gasoline. The fuel tank is hung under the rear of the chassis and gasoline is fed to the carburetor by pressure maintained by a small pump operating from the camshaft.

Cranking and Lighting Equipment

The electric cranking and lighting equipment is of the Westinghouse make, embodying a generator driven off the pump-shaft and a motor operating through silent chains on the crankshaft. The system is of the six-volt type.

Connection of the cranking motor by silent chain directly to the crankshaft of the engine eliminates the less direct connection through the half-time gear or the necessity of cutting teeth on the flywheel when the motor drives through the latter. Another silent chain to the pumpshaft drives the electric generator. This permits both electrical units to be mounted above the frame where they are accessible and at the same time permits them to be mounted rigidly upon the motor.

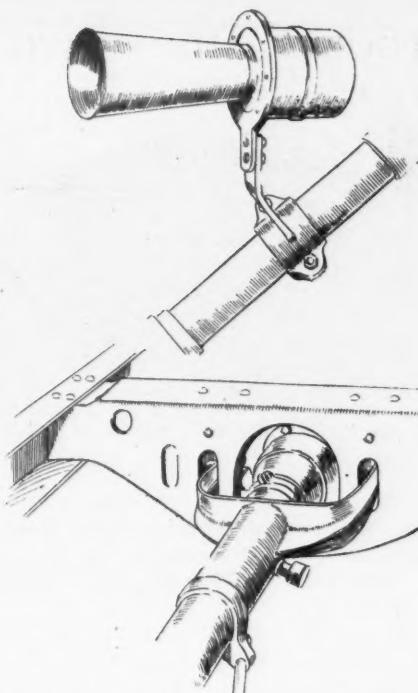
The clutch marks a departure from former Marion practice in that earlier Marion clutches were of the cone type.

In the flywheel is the multiple-disk clutch of raybestos and steel faces. There are ten driven and nine driving disks. The motor and clutch forms a unit suspended at three points. It is swiveled to arms at the middle of the front cross member through a trunnion which forms the single front support, while the rear points of support. The triple casting of the cylinders has permitted some rather unusual arrangements in the way of magneto, carburetor, and water connections. With the steering wheel located on the left side and the carburetor and magneto on the right side, the spaces between the two triple castings is utilized for the carburetor and magneto connections. Also this space is employed to carry the lead from the water pump to the right side, where it branches to the cylinder casting.

Easy Adjustments Provided

Considerable care has been taken in arrangements for easy and quick adjustment about the motor and clutch. For instance, there is provided a hole in the housing at the rear of the motor to permit the insertion of a tool for adjusting the rear end main bearing. Likewise a hand hole for clutch adjustment is provided. From the clutch power is transmitted through an inclosed propeller shaft to the covered gearset on the rear axle. The gearset provides three speeds forward and the gear faces are $1\frac{1}{8}$ inch. The forward end of the torsion tube inclosing the propeller-shaft is swiveled to the central cross member of the frame through a yoke mounted on trunnions. In connection with it distance rods are used. Just above the yoke and mounted upon the same cross frame member is the centrally located lever operating the gearshift as well as that for the emergency brake.

The axle is of the floating type and instead of the usual dog fitting into the hubs of the rear wheels the live shaft in the axle is finished with a deep flange that bolts on the wheel itself. Thus there is no chance of lost motion in transmitting power to the wheels. The rear system as a whole with the gearset case bolted to the differential housing is used because it is believed it offers advantage that the long driving shaft and universal joint is relieved of practically all strain except the torque of the motor, while the final driving load is carried by a short and sturdy shaft direct from the transmission gear to the drive pinion. The gear ratio in the rear axle is such as to give $3\frac{3}{4}$ to 1 on third or direct drive. The gears and shafts both in gearset and rear axle are $3\frac{1}{2}$ per cent nickel steel and all bearings are Hyatt roller bearings. The frame is mounted on special imported Sheffield steel springs, semi-elliptic in front and three-quarter elliptic in the rear. Both emergency and service brakes are internal and



Mounting of Marion horn on steering column and yoke on forward end of torsion tube

a turnbuckle on the rear end of the brake rods provides quick adjustment.

One of the points which show the careful attention to detail is the elimination of the grease cups on the spring shackle. Instead of grease cups the shackle bolts are made hollow and act as oil reservoirs with wicking to lubricate the bearing surfaces. By the present arrangement the oiling of the spring shackle, which, it is stated, is required not oftener than every 2 months, means simply the removal of a small screw which covers the oil hole. A contemplated change for the sake of handiness is the provision of a cap that may be removed by the fingers.

Details of Refinement

Another of the details of refinement is the rubber bumpers set in to the under side of the frame, replacing the bumpers usually placed on the rear axle as an afterthought.

The wheelbase of the Marion six is 124 inches, and tires are 25 by $4\frac{1}{2}$ inches. These are quick detachable on demountable rims and one of the features of the new car is the arrangement at the rear of the body for carrying a spare tire. Instead of the usual basket or strap an auxiliary felloe is mounted on the rear of the frame and the extra tire is mounted on this and bolted in place exactly the same as on the wheel, except that only one lug is used. This lug holds the rim in place but is at the same time easily removed by the tire wrench.

Left Drive an Innovation

Another innovation for the Marion company is the adoption of the left-side drive in connection with the center control. This latter feature has been a Marion practice for some time. The lighting and ignition switches, ammeter, gauges and other control and indicator instruments are placed on an instrument board just far enough under the cowl to protect it from the weather. In general the tendency in the body construction has been toward straighter lines except for the slight bell shape at the rear and for roominess. The fenders follow current practice in being smooth pressed steel and have the deep lip that has been found necessary to prevent the body from being splashed.

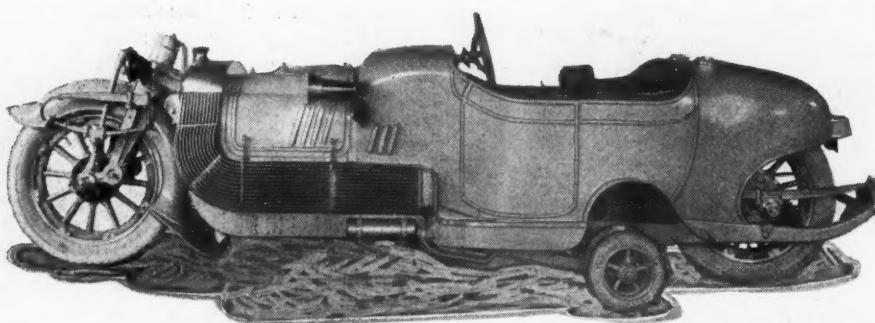
In the matter of equipment the car seems very complete, including a Stewart 60-mile speedometer, Truffault-Hartford shock absorbers, robe rails, foot-rests, etc., and one appreciated by the driver is a gasoline gauge on the tank. Electric lighting is conventional except that the headlights are mounted upon straight vertical rods which carry them higher than usual; the side lamps are inset in the dash. A novelty in the way of horn mounting is found in the Marion six in which the electric horn is mounted on a special bracket attached to the steering column and under the hood.

A four-cylinder car embodying some of these refinements is in the process of development.

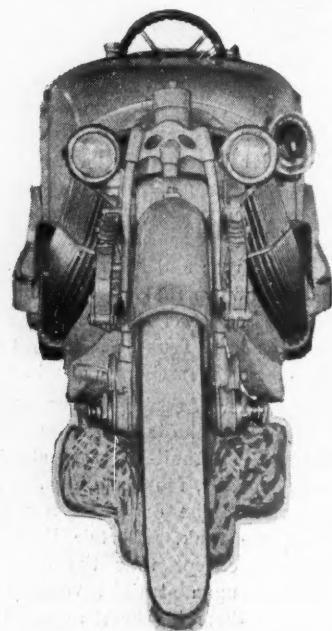


Side view of the new Marion six-cylinder, five passenger touring car, showing body and fender lines and the side lights inset in the dash. This model is known as the G-5

Detroit's Latest Product, the Two-Wheeled Biautogo



THE BIAUTOGO, PERHAPS THE MOST NOVEL MACHINE SINCE THE MOTOR CAR CAME INTO EXISTENCE.



FRONT VIEW OF THE BIAUTOGO

IT is doubtful just what form the sportsman's motor car of the future will take, for the man of means soon tires of the conventional and with motor cars as with everything else he is constantly looking for something different. Think of the duck boat, whaleback and other unique body designs which have appeared here and abroad, built according to the ideas of motorist sportsmen.

It was with this attitude that James Scripps Booth, of Detroit, Mich., several years ago set out to design something propelled by a gasoline engine which would be out of the ordinary. The idea of developing a strange vehicle such as that pictured here, which Mr. Booth has christened the Biautogo, long ago was held by him, the first sketches being dated at Paris about 3 years ago.

A Motorcycle Motor Car

The Biautogo was not developed primarily with the idea of placing the vehicle on the market for general sale, although Mr. Booth had made at the same time a duplicate set of parts complete so that another identical vehicle could be assembled. It was intended to exhibit the machine,

which is really a cross between a motor car and a motorcycle, at last year's national show in New York, but it was impossible to complete it in time for that exhibition.

However, the vehicle has since been completed in excellent style and presents a most finished appearance throughout. At first glance, even the veteran motorist who can spot any model of any make of car will be at a loss to tell at just what he is looking. In fact, the design is so absolutely unique that one feels that he is gazing at something out of a fanciful writer's works. But after he pinches himself a couple of times, he realizes that he is gazing at a real, live "something new" in the motor car field.

Runs On Two Wheels

The Biautogo is a machine carried on two large main wheels and has also two smaller balance wheels on the sides which are pressed into service at low speeds. When traveling about 20 miles per hour these small side wheels may be raised, when the car balances on its two main wheels just as a motorcycle or bicycle balances. The seating capacity is three persons—the driver sitting forward of the main double seat. This driver's chair is hinged to swing forward to admit the rear seat passengers. The steering wheel passes through the dash board on which the various gauges are attached. The wheel is in the center, as are the control levers, the driver sitting astride of them. The control is standard with the exception

that the clutch and service brake pedals are in reverse position as compared with the conventional car, the clutch being to the right of the brake pedal. Besides the regular brake and gearshift levers, there is a third lever which operates the side balance wheels, an eccentric mechanism making it possible to raise them about 4 inches.

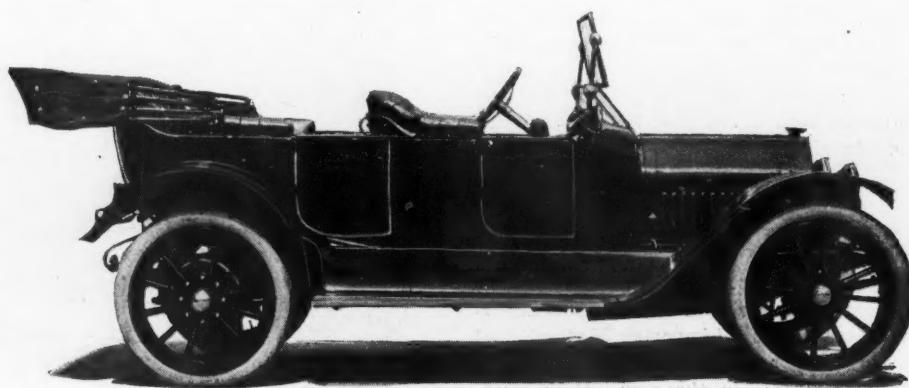
Eight-Cylinder Motor Used

The motor is an eight-cylinder, V-constructed block-cast type, designed throughout by Mr. Booth and having a horsepower of about 45 with 3 1/4 by 5-inch cylinders. It is an L-head, and there are two main crankshaft bearings as well as four lower connecting rod bearings, one set of rods connecting to the other set at their lower ends through integral bearings in the first set. Thus only one set of bearings actually connecting with the crankshaft are needed, and with this arrangement, the pistons really work in tandem, so to speak.

This two-bearing crankshaft is drilled for oil, a pressure pump sending lubricant through the shaft and to the lower side of the bearings. Valves in this Booth engine have a clear opening of 1 1/8 inch and are set at an angle of 12 degrees to the cylinders. Another crankshaft feature is the fitting of a ball thrust bearing which takes the side thrust off the main bearings.

The carbureter feeding to a double intake manifold is mounted in the V between the two parts of the cylinder casting, while a Bosch dual magneto sticks through the dash at the rear of the motor and is accessible from the inside of the car by the removal of a plate which covers it.

The car carries an air cracker, the pressure for which is produced by a Kellogg air pump which sends the air to two storage tanks under the dash shroud. The air distributor is driven off the camshaft, while there are check valves on the cylinders. If necessary to crank the motor by hand, this can be done by the insertion of a hand crank in the right front side, where a shaft connects through bevel gearing to the front of the crankshaft.



MOLINE M-40, FIVE-PASSENGER TOURING CAR

Besides this starting system there is a Gray & Davis generator which produces current for the lights. This generator is slung on the side of the gearcase and is driven by a silent chain from the shaft. Back of the 12-inch flywheel there is a 10-inch cone clutch of standard type lined with Raybestos. The four-speed gearset is also of standard design and by its position directly under the driver's seat is easily reached by the removal of the floor board. The gears are oiled effectively by the Renault system. An oil pump driven off the rear end of the countershaft sends oil through a tube to the point of mesh of the several sets of gears, placing the lubricant constantly where needed.

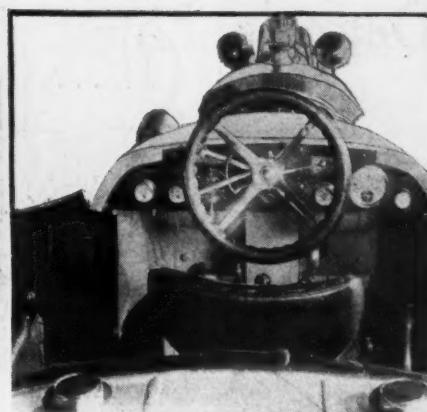
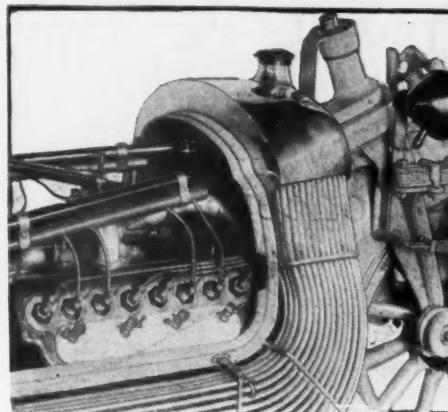
At the rear of the gearcase there is a bevel gear and pinion driving a shaft at right angles to the main shaft. On this cross shaft there is a sprocket over which a Whitney roller chain passes, conveying the power back to the rear wheel shaft. This driving chain is completely enclosed and runs in oil. The reduction from the main shaft in the gearset to the rear wheel is $3\frac{1}{2}$ to 1.

Radiator Original Feature

Perhaps the most original feature of the whole construction is the radiator, which is made up of banks of copper tubes on either side, following the frame from the front to the rear of the power plant. There are two water tanks, one at the front which has a filler cap and the other at the rear. The water flows from the front through an upper series of tubes to the rear tank and thence returns to the forward tank through the rest of the tubes. From here it flows by gravity to the pump for recirculation. To make this cooling device, 450 feet of $\frac{1}{2}$ -inch copper tubing was required.

The front wheel is carried within a steering fork of generous proportions and the front springing is obtained through a seven-eighths elliptical spring and lever-arrangement similar to that used on motorcycles, though on a much larger scale, of course. The steering head is of bronze and the turning of the front wheel is accomplished through the use of roller chain and bevels at the steering rod end and at the steering head.

Rear springs are half-elliptic and the rear axle shaft is slung from its springs. The rear of the frame has a true underslung construction, as the side view will



THE 8-CYLINDER V MOTOR AND NOVEL RADIATOR AND VIEW OF THE DASH EQUIPMENT, STEERING AND SEATING ARRANGEMENT OF THE BIAUTOGO

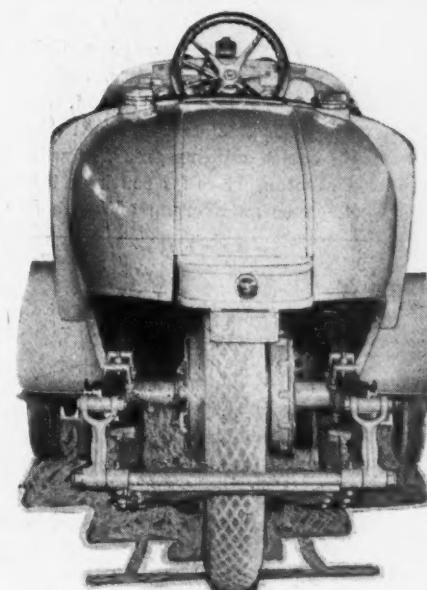
bring out. To maintain wheel squareness, the main front and rear springs are tied together across the car in such a way as to compel uniform action.

Obviously some method for the demounting of the wheels for the changing of tires was necessary, and while it is easily seen that there is not much of a trick connected with the taking off of the front wheel, the rear presented some difficulties which had to be surmounted. As designed, it is a simple matter to remove the rear wheel. In the first place, the rear of the body is raised to clear the wheel, then four detaching bolts are taken out at the hub, and after the removal of the hub cap on the opposite side, the axle shaft may be readily driven far enough through to free the wheel. The axle might be called floating, since this removal of the shaft does not disturb the sprocket or chain.

Gasoline is carried in two separate tanks, one on either side at the rear. These are of equal capacity and there are two of them for balancing purposes, a like amount being carried in each.

Unusual Equipment for Two-Wheeler

So much for the technical features of this interesting mechanical creation. Other features which will bring out the completeness of the car are the electric speedometer driven off the right end of the jackshaft, the demountable rims, the Turkish upholstery, the cast aluminum front mud guard, the sheet aluminum body, the built-in tail light, invisible door hinges, mixture adjustment on the dash, combination switch in the dash giving any selec-



REAR VIEW OF THE BIAUTOGO

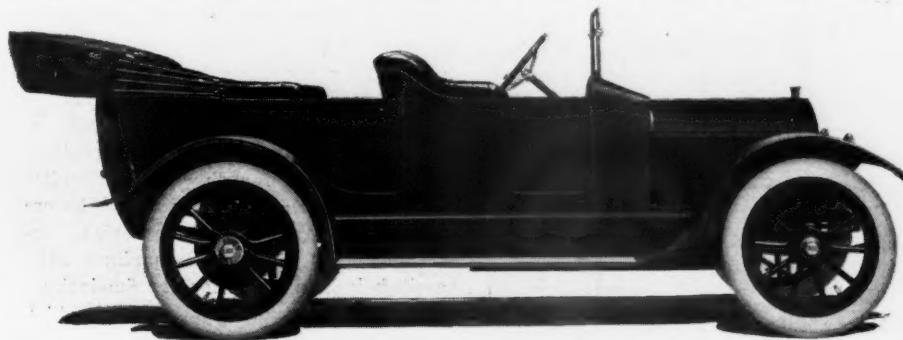
tion of lights, Klaxon horn button concealed in an arm of the steering wheel.

The main wheels are 37 by $5\frac{1}{2}$ inches and carry standard motor car tires, while the balance wheels, two of which are carried side by side on either side of the car in dual fashion, measure 15 by 3 inches. These small wheel tires are not pneumatic, but are specially made and contain a tire filler. The outfit with filled tanks weighs 3,200 pounds. Its wheelbase is 140 inches, overall length 184 inches, frame width 26 inches, overall width 50 inches and road clearance 10 inches.

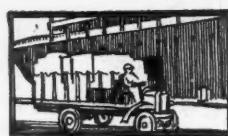
The designer states that his toy will make about 75 miles an hour as a maximum speed, but it is doubtful if he will find any roads over which this two-wheeler can run along at such a clip.

CAR ILLUSTRATIONS TRANPOSED

The illustration on page 26 of Motor Age, August 21, captioned "The New Case 25" should be entitled, "New Series Moline M-40," and should appear over that caption on page 29. The illustration on page 29 shows the Case 25 and should appear on page 26. The error was due to a transposition of cuts.



NEW CASE 25, FIVE-PASSENGER TOURING CAR



The Realm of The Commercial Car



Chicago Wholesale Concern Hires Trucks from Itself

Pick Company's Unique Plan of Management

ONE of the largest fleets of motor trucks in Chicago is operated by the Albert Pick Co., wholesale merchandise, under a unique plan of management. There are fourteen trucks in the installation, ten of 1-ton capacity and four of 2-ton capacity.

Thirteen of these cars work from the warehouse, situated 6 miles from the heart of the city, and one from the main store at the city center. They average a daily mileage of from 50 to 60 miles, making forty-five stops, in the dull season, and sixty in rush periods. The suburban trucks, covering the entire outlying areas, 18 miles north to Evanston, 11 miles south and 12 miles west, cover an average of 75 to 80

miles a day, making fifty stops in the period.

These distance machines are all 1-ton. The 2-ton machines work to the freight stations, about 8 miles away, on the average, making two to three trips a day, covering an average of around 36 miles per day, and hauling 5 tons each per day. The following are listed runs to these stations:

August 12—Ten stops at ten stations, 35 miles, 7:30 a. m. to 6:05 p. m.

August 13—Ten stops at ten stations, 37 miles, 7:25 a. m. to 6:10 p. m.

August 13—Seven stops at seven stations, 40 miles, 7:30 a. m. to 6:00 p. m.

The deliveries for the Pick company are far from standard in size and may vary from a light bulky garbage can to a complete outfitting set for a restaurant, making two or three loads. The loads are made up mostly of boxes, barrels and packages of more or less bulk.

Sales are handled from the downtown store, which is a display of stock carried at the warehouse. Any material sold from the main store direct is replaced, a truck operating between the two stores, and making four trips a day. This machine operates through heavy traffic and over poor pavements, but covers the 6 miles in about 40 minutes. Each loading takes on the average 25 minutes.

The trucks are handled in a unique way, being cared for separately from the main plant and store. A certain amount of money, about \$35,000, is set aside in equipment, tools, machinery, buildings and trucks, on which the delivery department pays 6 percent interest to the firm. The department then furnishes the trucks to the firm at a flat rate per day, this including the operation of four touring cars. The cost per day was figured from contract rates in Chicago and is close to the usual average which, as is known, is \$12.

Garage Separate Organization

The garage department pays its own bills, handles its own money and in all essentials is a separate organization. From the depreciation fund enough money is accumulated to buy new trucks when the old ones wear out, and this money, as accumulated, is used to purchase bonds, etc., until such time as it will be needed. Every effort is made to make every item pay. The depreciation is figured per month for the cars as follows:

2-ton cars	\$60
1-ton cars	45
Touring cars	45
Runabouts	20 to \$35

It will be noted that there are a number of motor cars used beside the trucks, and these are housed in the company's garage, and used during the day for the various purposes of the firm. They have no bearing on this story other than their effect on the garage system costs.

For tires, each car is allowed \$20 per month, and the truck tires average from 9,000 to 10,000 miles each with no difficulty.

Cars are inspected every morning before they leave, not only for mechanical correctness but for spotless cleanliness, the result being an exceptionally fine-looking fleet of well-groomed units, each of which is a source of pride to its driver.

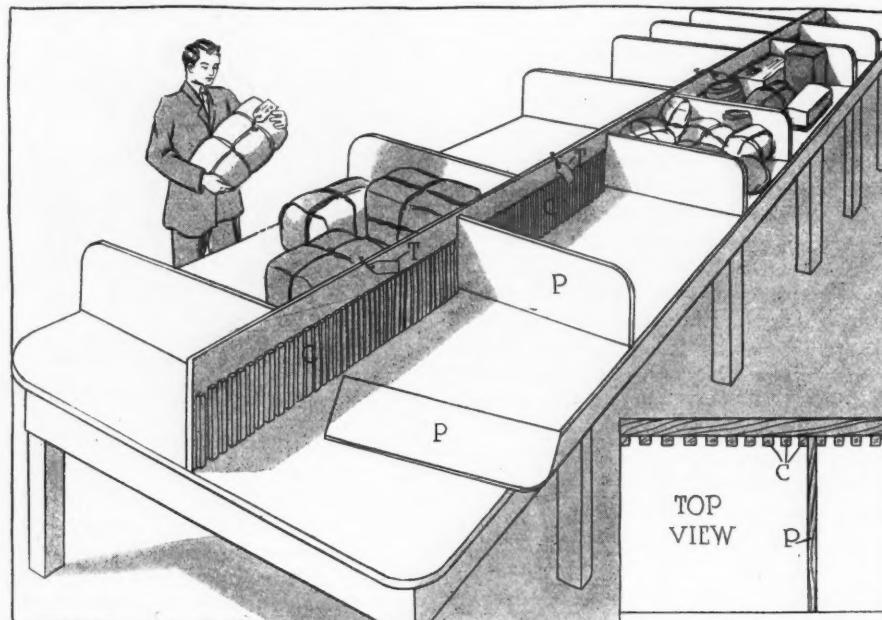
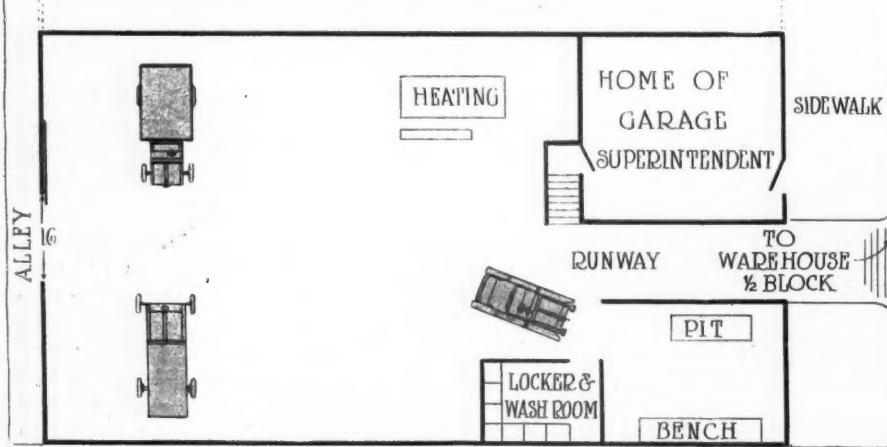


FIG. 1—ROUTING TABLES USED BY THE ALBERT PICK CO.

THIS SPACE TO BE ADDED



PLAN OF PICK COMPANY'S GARAGE

The drivers are educated in their work through the helper stage, for each truck carries a helper. A helper is allowed to study the truck and its operation and is encouraged to grow. As he develops he is finally put to work at first on extra runs and the like until he develops proficiency enough to take a regular route.

New Features of Garage

The garage itself has a number of new features, the garage superintendent, for instance, being housed at the garage in a neat little five-room flat with rent, light and heat free, so that he is on call at all times of the day or night. The garage layout is shown in Fig. 1. The floor of the garage is several feet below the street level so that the cars enter down a runway, 15 feet wide, to get into the main room. As they enter, through a neat arched stucco doorway, the superintendent's flat is at the right of the passageway, the repair shop at the left, and both can be reached from the big room inside the garage. The flat, of course, has a front entrance from the street. The extreme width of the garage inside is 80 feet.

The shop, on the left as you enter, is fitted with bench tools and has in the floor a repair pit of ample size, the benches arranged along the side wall.

The garage is too small for the number of machines now used and it is planned to double its size in the near future and put in power machinery so that all repairs can be handled without hiring outside. At the present time when all the cars are in at night there is little room to move about.

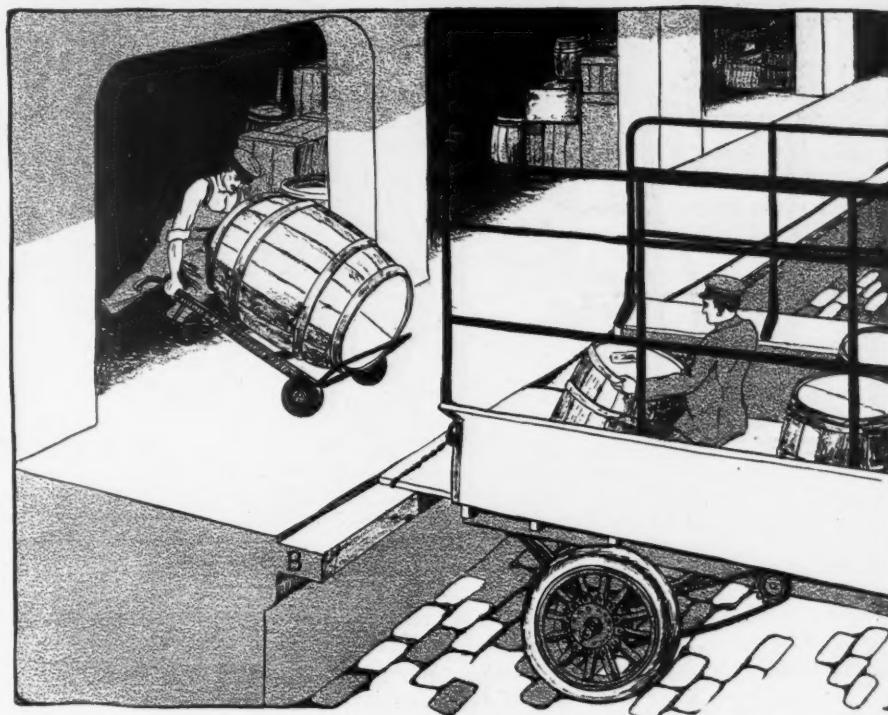
The entire length of the garage is 150 feet. Space enough is used up by a heating plant set on the main floor to accommodate two more small trucks if this plant were put in a basement. The garage is located but one block from the warehouse and is very handy for all service.

An idea well worth copying by other firms is that of a weekly lecture to the drivers by the manager of the department. This meeting, and discussion following the talk, cements the drivers into an organization for mutual improvement, and here ways and means are worked out for improving service, for personal advancement, etc. The talks are on business courtesy, or maybe on the effects of faulty lubrication. Every phase of the work in the hands of the drivers is taken up in order of importance. This is said to be very much appreciated, and the results obtained to more than repay the expense and extra work the idea entails.

Garage and Truck Records

The garage and truck records are kept on a set of five forms: the chauffeur's daily report, the monthly truck report, the annual car report—these taking care of the cars themselves and the drivers—a yearly garage expense report and a tire record.

The driver's report makes record of the following items: Date, car number, number of stops, miles traveled, gasoline used, oil used, tire trouble—especial note being



ARRANGEMENT OF PICK COMPANY'S LOADING PLATFORM

given as to which wheel and the kind of trouble. In the remarks column motor troubles, accidents, extra delays, etc., are reported. At the bottom of the card are listed the time of leaving the garage, the time of return, and the driver's name. The form is on stiff manila paper and is 3 1/2 by 6 3/4 inches in dimensions.

Daily Report Card

From this series of records the daily report card for each car is filled out, this being white cardboard 13 by 14 inches, with a line for each day of the month. At the top is the name of the truck make, and the number. The columns after each date list as follows: driver, helper, out, in, stops, miles, gasoline—quantity and cost—oil—quantity and cost—grease—quantity and cost—and repairs. Under the latter subdivision come operating cost, labor cost, sundry expenses and remarks.

This form gives a complete record by the day of each truck in the garage and, as stated, it is posted at night by the garage superintendent from the chauffeur's daily report card.

From these reports the annual statement is made, this being on a white card 9 1/2 by 16 1/2 inches, listing at the top the car number, date of purchase, cost, chauffeur and boy helper. Below this follow twelve horizontal lines, one for each month as named in the left hand column. At the top of vertical columns are the following: year, month, vehicle tax, fire insurance, theft insurance, liability insurance, collision, property damage, tires, gasoline, oil, new parts, repairs, time on repairs, chauffeur salary, boy salary, percent of garage expense, number of miles, number of stops, amount received for old tires, and accidents. It would be hard to think of anything else that might be included and the report is

certainly comprehensive. On the reverse of this card are listed on a horizontal line the extra tires carried, and the tools represented in each kit.

The garage expense card is 9 by 11 3/4 inches, listing the months of the year at the left in a vertical column and at the top of vertical columns across the top are named the year, rent, heat, light, salary superintendent, salary mechanic, salary assistant mechanic, salary washer, salary extra, fire insurance, burglary insurance, interest on investment, and taxes. Four extra columns are left blank for remarks.

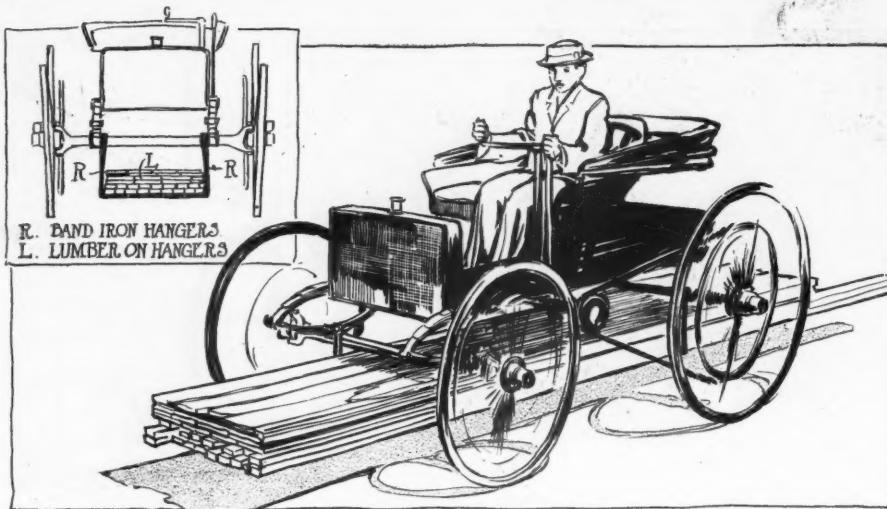
At the bottom all the figures are totaled and the entire resulting yearly expense divided between the cars in the garage on a percentage basis.

The last form is a tire record with vertical columns as below: Car number, wheel number, factory, factory serial number, date on, date off, size, mileage, guarantee, cost, repairs, selling price, remarks. The card is 8 1/4 by 11 1/4 inches, with space for report on twenty tires.

Cards Show Driver's Proficiency

These cards form a complete record of all that goes on in the operation of the vehicles, and furnishes at any time a check upon every item. If drivers are reckless the tire bill shows a cause for investigation or the repair bill, in being higher than other cars. The gasoline item and oil column each show the driver's proficiency as a motor man, while the stops and miles per day show his ability in delivery. The firm uses one make of tire only, so that tire dealings are simplified.

The delivery platform at the warehouse is just high enough so that the tailboard of the trucks just projects over the top, and a bumper rail of timber is provided below to save the use of a steel plate. This



MOTOR BUGGY USED TO CARRY LUMBER

is shown in Fig. 2, which shows the tailboard let down to rest on the bumper. The top of the tailboard then is flush with the platform, and backing the truck against it there is an excellent joint over which the hand trucks roll without the need of a steel plate, as is used at most platforms and which wastes a great deal of time. The upper ledge, of course, is made just the thickness of the tailboards, and all cars are of the same height.

Pick Shipping Room

The shipping room of this firm is deserving of a separate story and will only be touched upon. One system is, however, worth especial mention, this being the arrangement of the delivery bins. Each delivery is bulky, not small as in package delivery, and takes up some space. To sort the deliveries a special bench is provided and adjustable compartments.

The bench is wide, with a partition built lengthwise through its center, making two tables. On either side of this partition are rows of upright sticks about an inch square, nailed to the partition about an inch apart. These are about 12 inches high.

Partitions are provided as at P, made of inch board, and these can be stuck between any two of these upright sticks or cleats C, so that the compartments between these partitions can be 20 feet long or but a few inches. On a nail at the top of the partition is stuck a tag noting the delivery, as at T.

Orders received from the main store are listed at tables placed at the end of these long sorting tables, and are filled from sheets given out by the clerk in charge to the order boys. These fill the order, placing them on the table between partitions placed to receive them, and when the order is completely filled, send the filled order back to the office by an overhead belt conveyor, where it is entered as filled.

How Orders Are Handled

All orders from the main store are filled and delivered the same day. When all the orders are filled they are taken to bins according to routes, and, from here, taken to the trucks at delivery periods. The house throughout is fitted with gravity and spiral chutes for the delivery of matter from upper stories to the shipping room in the shortest possible space of time.

Peddler Unable to Use Motor Truck

So much has been said and written about the motor truck being available for every use that the following interview with a man engaged in peddling is interesting. First, while it applies to peddling alone, some parts of it may apply to milkmen as well. And moreover the man interviewed is not prejudiced against the motor vehicle as he is willing to admit that in time they will become more adaptable to such use as he makes of a horse and wagon. It should interest salesmen and manufacturers, the former so as not to waste time and sell vehicles where they are not available, and the latter to try to solve the problem for the class referred to which is a big one in this country.

Frank Prunier, who owns two big farms

in Charlton, Mass., and makes daily trips for several miles around that vicinity selling his produce from his wagon, is the man who is responsible for the following comments: "Motor cars and peddlers have not yet been able to strike a dicker where either one is the least bit of use to the other. Peddling is about the only business I know of where motor vehicles are absolutely impractical. I have seen them tried and I have seen them fail in the tasks assigned to them."

Trucks Are Too Fast

"While they have speeded up business the same as the telephone and the telegraph did in their lines, yet in my work they could not do it. They are too fast for the work. There is one spot where

they might fit during a small part of the season and that is in carrying the produce from the farm to the big city market, but once there it would have to be transferred to wagons if it was to be peddled. To land it at the market and let the commission men take it would be all right, but to peddle the produce in the city by the farmer a motor truck would not do.

"Why? Well, one of the first and best rules of peddling is to pass along slowly and watch sharply for any signal from any window in any building where someone is looking for your wares. In these days many people will not lean half way out of a window and yell to you. The best class of customers simply nod or raise their hand, then up you go with a sample basket of your wares. Suppose you had a motor truck and you were trying to slow it down to the gait of a horse when peddling? If the motor began to miss you would have to start maneuvering with it. Meanwhile your attention being on the wheel, throttle and other parts you would be missing your customers, for once having passed a block of houses you would not care to walk back.

Frequent Stops Necessary

"Moreover, the peddler stops his wagon about every 50 or 100 feet. To crank up every time you wanted to move that far would be absurd. You could not let the motor run unattended because it is against the state law. Self-starters may help solve the problem later, but they would have to be light and dependable. Perhaps when they work out this new plan of getting away from gear-shifting and simplify the motor truck, they can make something adaptable to our class. But it is the pleasure vehicles that get all these new things.

"The trouble with many makers is that they think the farmer wants a car to carry his stuff to the city and nothing else. But there are thousands of farmers who peddle their own produce from house to house. If vehicles were designed for this class alone there would be a sale of many thousands. What the makers should consider is the comparative sizes of the peddler's wagons compared with the trucks they put out, and then figure on the prices.

"Produce is so light that a fair day's load takes up a lot of room. It can be handled on the peddler's wagon easily but to get a truck that would carry the same load one would have to take a big one, 3 or 5 tons, with a large motor, when a smaller motor with a lighter, but roomier body would do. And the cost of the vehicle was out of proportion for its use, prohibitive.

"Those I have seen who bought motor vehicles for peddling found that they could not give their attention to both, and divided attention meant a loss. Some had

vehicles with pneumatic tires. They knew little or nothing about the machines. There were times when they were fussing over tires or motors when people were calling to them for goods. It was do one thing or the other, and naturally they stuck to what they were first doing while

another fellow came along and sold goods with a horse-driven vehicle. I am not prejudiced against the motor vehicle, for there are many ways in which it is useful to a farmer, such as the long haul to the city, but for the peddler the horse will prove more efficient.

Old Motor Buggy Used for Lumber

THE latest lumber truck is of the buggy type, and was seen in Chicago recently, progressing easily with a full load of perhaps 500 pounds of dressed lumber hanging beneath the axles.

The progressive driver may have had the motor buggy before he entered the carpenter end of trade, or may have acquired it since, but whether or no, he had fitted it up most ingeniously to make the low-priced outfit do his work.

The machine was not a truck, or a delivery car, but a mere motor buggy with a frame made of band iron rigged under the axles. This frame formed a cross-piece some 10 inches from the ground, and on the crosspieces rested the load of long boards.

While the machine had a load weight well above the intentions of the designer of the car, when seen it was progressing slowly and carefully over smooth pavement. It would be interesting to see later the tire bill of the progressive owner.

The idea is not exactly one to be copied, but shows one of the many ingenious ways which are being adopted here and there to fit old vehicles to new services.

Another car seen recently was running for a Chicago expressman. This was one of the old original electric coupes which in the early days carried the elite of the city to the theater and ultra-fashionable cafes. Lo! how the mighty hath fallen! The body

has been sawn off down level with the rear seat, and forward to the back of the driver's seat, the piece of the door left below being nailed shut. On top of the frame left is fitted a cheap box body and the car of the rich has become the trunk wagon for the corner expressman. The gears are noisy, and the paint old, but the car is still doing business and giving service.

Every once in a while one sees an Orient buckboard doing business for some small store, or an old original Locomobile steamer used for some special purpose. It is still to be proven as to just what the real life of a truck or car is, and just what field each car is fitted to; for if a motor buggy can haul lumber, and an electric coupe carry trunks, will limousines form future chicken coops and moving vans houses for the floating population?

BAKER INNOVATIONS

Four 2-ton Baker electric trucks are in the service of the New York Edison Co. For the purpose of making quick battery changes, so that its trucks can be kept in service continuously, the New York Edison Co. has equipped its electric truck garages with pneumatic lifts, and the battery cradles on all of its electric trucks are specially designed to take batteries from these lifts as they are brought straight up from the floor level into the battery cradle. Instead of putting the batteries in through the side of the cradle in a number of trays, they are lifted up through the bottom and fastened in automatically. The automatic catch and release in the trucks is so designed that it is entirely inside the battery housing, unexposed to mud and water.

The Goodyear Tire and Rubber Co., of Akron, O., recently purchased a 3½-ton Baker electric truck which is to be used in dual capacity: First, as an electrical testing machine to measure the efficiency of all Goodyear electric truck tires by actual run; second, general trucking between the Goodyear plant and depots and over the course chosen for tire testing. The

truck is equipped with a complete set of extra wheels so that tires may be adjusted on one set of wheels while the truck is running. In this way little time is lost in changing tires for the test run.

The Baker company also has a truck in service in Porto Rico. On account of the torrid heat there and the long haul of 6 miles over which ice must be carried from the ice station to the sub-station, it was necessary to have the truck body as near heat-proof as possible so the following special instruction was followed out. The side, front and roof are of double panel construction, 4 inches thick and all packed between the panels with cork. To withstand the intense heat from the ground, the floor is made 4½ inches thick and is built in layers. From top to bottom, these layers are 1 inch solid oak plank; 1¼ inch of asphalt composition; 1 inch of cork board; ¾ inch Georgia pine boards. The rear doors of the truck are regular refrigerator doors.

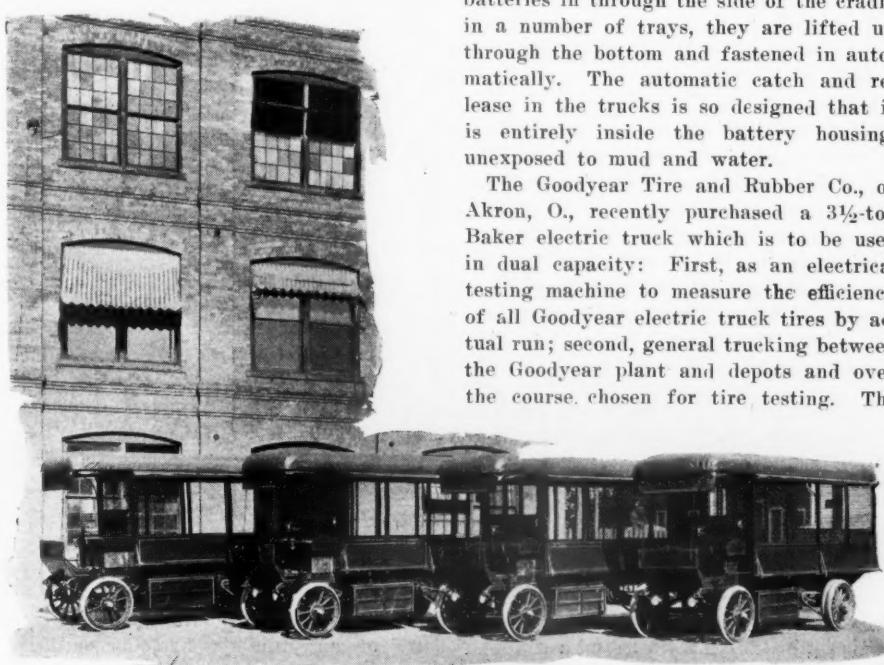
There are trap water outlets in the bottom of the truck. These outlets are so designed as to let water out and not admit air as a little water is always standing in the bottom of the trap. When the rear doors are closed this truck is a veritable refrigerator, practically air tight, and will carry ice in hot Porto Rico many miles.

Inside the body are adjustable cross bars which can be put in against the ice to hold it from shifting while in transit, whether the truck is loaded full or not. The rear step, which is shown let down, is a folding step and when folded up will not permit any one riding "free of charge." There is a ticket box back of the driver's seat; this is where the lazy Porto Rican drivers drop the ice tickets.

BENNETT FAVORS BONUSES

The bonus system for motor truck drivers, such as is now in general use in England and parts of Europe, is meeting with favor among American truck owners and manufacturers. The system is a simple one, merely providing extra compensation for those drivers who establish good records of economy and efficiency in the operation of their vehicles. Vice-President G. W. Bennett of the Garford Co. has gone on record as being in favor of the adoption of the plan in this country, declaring that the extra cost to truck owners is more than made up in lowered maintenance costs and longer life for the vehicles.

"The driver is a mighty important factor in successful motor truck operation, and any system whereby his carefulness of his employer's interests and his efficiency are increased will surely be welcomed by American business men," says Mr. Bennett. "While motor truck drivers are, as a class, as high-grade workmen as can be found in the world, they are bound to do better work with the added incentive of a reward for greater efficiency and economy. The same rule holds true in every business."



NEW YORK EDISON CO.'S FLEET OF BAKERS



The Readers' Clearing House



HEATING VALUE OF GASOLINE

Increasing the Boiling Point of Water by the Use of Glycerine

LAGGAN, CAN.—Editor Motor Age—I would like to know the bore and stroke in millimeters of the Delage car driven by Guyot in the French grand prix of 1913, also the valve arrangement and valve timing.

2—How much is the boiling point of water in the radiator increased by using small film of glycerine oil, and is it wise to use glycerine in the radiator of a motor working at an elevation of 6,000 feet, boiling point of water at this point being 200.7?

3—How many British thermal units are contained in 1 gallon of gasoline, testing 58 specific gravity, and what effect, if any, would the light dry air of this altitude have on the heating value of this gasoline.—C. K. Sutherland?

1—The bore and stroke of the Delage driven by Guyot is 102 by 178 millimeters. There are four valves per cylinder, the valves being arranged horizontally in the head.

2—By using a film of glycerine over the water the boiling point is increased and according to Kent, page 550, this is considerably above its normal standard.

Motor Age has not tried this experiment and therefore cannot tell you of the value of glycerine as an aid to increasing the boiling point, but it appears that since glycerine is not harmful to the metal of the radiator and if used in small quantities will not clog the cells, it would be advisable to try it for a while, noting the results. If to all appearances it does the work without harmful results then it is to be desired. If it works with glycerine, then try linseed oil, which has a boiling point of about 597 F., for this is much cheaper than glycerine.

3—There are approximately 20,500 B.T.U. per pound of gasoline. A gallon is equal to 6.22 pounds, therefore a gallon of gasoline would contain about 123,000 B.T.U. The heating value at high altitudes is decreased, due to the fact that as we ascend the percentage of oxygen decreases and, since the heating value is dependent to a large extent upon the absorption of oxygen, we may say, the heating value is lessened.

WHICH CAR WILL STOP QUICKER?

One With Wheels Locked or With Brakes Just Holding?

New York—Editor Motor Age—Will a car stop in a shorter space when the rear wheels are locked and the car sliding, or when they are turning at a speed which is just on the point of starting to slide? I claim that it requires more friction to stop the wheels than to nearly stop them. Then, in addition the sliding tire will produce friction on the road. Hence, as it is the maximum amount of friction which has the greatest stopping power, I claim that the brakes should be locked and the wheels slide. I admit that this is injurious to tires but this is not to prevent the car from stopping quickly.

On the other hand it has been claimed that the maximum braking power is to be had just before the tire has begun to slide, as it is then that the tire has the maximum grip upon the road. To my mind this seems a statement that rolling friction is greater than sliding friction, which is obviously incorrect. A definite answer doubtless will prove of interest also to many readers.—Interested.

The car will stop within a shorter dis-

tance if the wheels do not slide and if the brakes are applied intermittently. The reason seems to be as follows: When the brakes are applied and the wheels begin to slide, the entire weight of the car goes forward, the only places of friction being the surfaces of the tires in contact with the road. When the wheels slide the driver has no control over the vehicle and if he keeps pressing the brake pedal he must wait patiently for the car to come to rest. The brakes in this instance do no work.

When the brakes are applied intermittently the effective braking surface is equal to the area of the brake drums and this area is by far greater than area of the tire contact surfaces. In this case the brakes are called upon to do their greatest work, whereas in the former instance they did no work, simply locking the wheels.

The surface tension or adhesion between

Questions Answered and Communications Received

C. K. Sutherland	Laggan, Can.
Interested	New York
R. E. Stevens	Woonsocket, S. D.
A. A. Leissring	Whitehall, Wis.
J. W. Cunningham	Hardin, Mo.
A. Subcriber	Hillsboro, Ill.
James Gill	St. Louis, Mo.
A. S. Thompson	Spring Valley, Minn.
M. K.	Ray, Ariz.
L. O. Fancher	Chicago
M. D. Leavitt	Beloit, Wis.
E. W. Stenslof	Salem, Ore.
A. R. Mansing	Gypsum, Kan.
A. Reader	Edgerton, Wis.
H. M. Patterson	Carey, O.
J. L. Cook	Springfield, Ill.

Cyclecar Section.

Max Smitt	Detroit, Mich.
A. E. Rylander	Chicago
J. M. T.	Minneapolis, Minn.
Peter O'Rourke	New York
F. R. H.	Cleveland, O.
Enthusiast	Chicago
H. S. Myers	Philadelphia, Pa.
J. T. M.	Council Bluffs, Ia.

No letter not signed by the reader's full name and address will be answered.

the tire and road is less when the tire has started to slide than when it is standing still, with reference to the ground. Hence, another reason for the car stopping sooner when the wheels do not slide.

It is true that sliding friction is greater than rolling friction, but you have neglected to see that there is sliding friction in the brakes of the car as cited in the second paragraph.

BATTERY SYSTEM NEEDS A TIMER

A Step-Up Coil Is Another Necessity for Auxiliary Ignition

Woonsocket, S. D.—Editor Motor Age—I have a model 17 Buick on which is installed a K-W model J high-tension magneto. It is hard to crank this engine the 40 r.p.m. necessary to start on the magneto. Is there any attachment or device in which dry cells can be used to facilitate starting?—R. E. Stevens.

The only way a battery system may be used is by installing a timer and a step-up coil or four unit coils. Timer and coil may

be bought separately and placed in the motor, the only difficulty arising being a means of driving the timer. Although a friction drive from the flywheel would help matters considerably, the usual method of driving the timer is by gears. If you will let Motor Age know your intentions in this matter, instructions for doing the work will be given.

MOTOR OF FORD CAR MISSES FIRE

A Little System Will Bring Good Results—Carburetor Blamed

Whitehall, Wis.—Editor Motor Age—I have a 1911 model T Ford roadster and have a great deal of trouble with missing in the engine. The local Ford agency is unable to remedy this missing. Since this trouble came up the agent has installed a Connecticut master vibrator, a new timer, new valves and piston rings, and have rewired the car throughout, but has not been able to locate the trouble. The carburetor has been removed about a dozen times and taken apart to be cleaned, and the needle valve adjustment has been changed, but no improvement noticed. The missing is more noticeable when running about 10 miles per hour. The car will not throttle down any lower without hopping along and bucking. The spark plugs do not soot up and when tested on the battery give a hot spark. The points are all set close and uniform. The carburetor is a Kingston, and I think it feeds too much gas, as the motor overheats running on the paved streets, and the motor is free from carbon. I think the carburetor is at fault. How can I adjust it? Would a new carburetor overcome this missing and overheating?—A. A. Leissring.

If a motor is missing the very first thing to do is to find out which cylinder is missing. To do this place the head of a hammer against the spark plug terminal and also touching the cylinder metal. The uneven firing is noticeable in a motor which is missing and if after touching the hammer head to a plug no difference is noticed in the unevenness, then that cylinder upon which the hammer is resting is faulty.

The next step is to examine the wire leading to the spark plug and also remove the latter. Note if the porcelain is cracked. Clean it thoroughly in kerosene. Trace the wire from the plug end to the coil, seeing that the insulation is in good order and that the contact points are not loose. Next examine the coils and the master vibrator. See that the vibrator is adjusted properly and that all wires leading from the coil box are tightly fastened. See that the wires leading to and from the magneto are clean at the contact points and that they are fastened tightly.

After every part of the ignition system has been examined measure the clearance between valves and their stems. Too much clearance at these points will cause the valve to open late and may cause a miss. If the clearance is not enough, the same result occurs. The space between the valve and stem should be just enough to permit of the insertion between the two parts of an ordinary business card or three thicknesses of newspaper. With the

valves adjusted properly and the missing continues still look to the carburetor.

In a Kingston carburetor the gasoline nozzle is locked with a nut. To give the cylinders more gasoline loosen the nut by turning it to the left—then turn the needle valve to the left until the motor runs properly. When the needle valve is turned to the right less fuel is supplied. You will find, no doubt, that one of the above ailments is causing the missing. Before attempting to change carburetors make sure that that part is causing the trouble.

STANDARD PERFECTION KEROSENE

Has More Heat Units Than Ordinary Gasoline—White Rose as Fuel

Hardin, Mo.—Editor Motor Age—What is the relative value as a fuel for motors between White Rose and Standard Perfection gasoline?

2—How many heat units in White Rose and Perfection gasoline?—J. W. Cunningham.

White Rose is a gasoline as we know that liquid and Standard Perfection is a grade of kerosene. With proper carburetion the latter may be used with success, but with the majority of carburetors on the market the former will show better results.

2—White Rose contains about 20,000 B.T.U. per pound and Perfection oil slightly more.

NO SPROCKET CHANGE FOR OLD CAR

Chain-Driven Locomobile Does Good Work With Present Ratio

Hillsboro, Ill.—Editor Motor Age—I would like to see a discussion in these columns on the relative merits of front sprocket sizes as used on a 1908 chain-driven Locomobile. The car is now being used as a bus running between this place and a town 8 miles distant with only two hills to pull. The gearset is a four-speed direct on fourth. The man, who has driven it since the car has been in use, says it pulls anything on direct with full load and does not strain the motor either. This is as it was when a pleasure car, the gear ratio or sprockets not being changed. Yet, in the face of these conditions the owner is strongly advised to use front sprockets of four-teeth smaller.

I contend that to keep up the desired vehicle speed the engine speed would be unnecessarily high, racking the engine, to say nothing of the same effect to the jackshaft. I can see no reason for the change. Would Motor Age advise such a change?—A Subscriber.

If the motor does its work well with the present sprocket ratio there seems no reason why it should be changed. If the sprocket were removed and a smaller one substituted it would mean a greater fuel consumption and shorter life for the motor. The only reason for changing the sprocket would be the inability of the motor to pull well with the higher ratio and extra load.

WHY RETARDED SPARKS HEAT

Reader Gives His Explanation of the Condition in the Cylinder

St. Louis, Mo.—Editor Motor Age—What is the reason for overheating when the spark is retarded? Explain fully.

2—Is the temperature in the cylinder at the instant of explosion the same at all times, irrespective of compression pressure? That is, would it be the same if the spark came as late as half the working stroke as it would be if the spark came at the proper time?

3—Why does carbon form as the result of retarded spark?

Is this correct? Suppose the spark occurs when the piston is up to within 1 inch of the top of the cylinder, then when the spark occurs, and explosion also, the intense heat of

that instant is distributed over the wall for a height of 1 inch. Then the piston goes down and the temperature decreases. We will exaggerate and say that there is a loss of 200 degrees in the 4-inch descent of the piston and that it takes 1-10 second.

Now take a cylinder in which the spark occurs as late as one-half the working stroke. This makes an area of wall that is 3 inches in height over which this intense heat at the instant of combustion is distributed. Now the piston moves down but it only has 2 inches left to travel, hence it only takes 1-20 second and temperature loss is in proportion, only 100 degrees.

Then we have in the retarded spark a greater surface exposed to explosion heat and a higher heat for the wall for the remainder of the stroke. Hence a warmer motor. Of course continued retarding of spark means carbon but we will take a new motor as an example.—James Gill.

1—Your last paragraph is the answer.

2—No. The higher the compression pressure, the higher the temperature, and vice-versa.

3—Carbon forms as a result of incomplete combustion of the fuel and such a condition exists when a retarded spark ignites the charge in a cylinder.

ELECTRIC LAMPS FOR MOTOR TRUCK

Filament Is Made to Withstand Excessive Vibration of Vehicle

Richmond, Ind.—Editor Motor Age—I desire information on the use of electric lights on motor trucks. Will electric light bulbs, as used on passenger motor vehicles, stand the constant jar caused by using solid tires on trucks?—A. H. Rodefeld.

The filament of the lamps installed in motor cars is so made as to withstand great shock, in fact they are tested for strength and are not as fragile as the ordinary house lamp.

WANTS TO LENGTHEN FORD CHASSIS

Results Obtained Would Not Pay for the Effort of Doing It

Spring Valley, Minn.—Editor Motor Age—I have a model T Ford touring car, and would like to lengthen the chassis as well as the body and make a seven-passenger car out of it. How much would it be necessary to lengthen

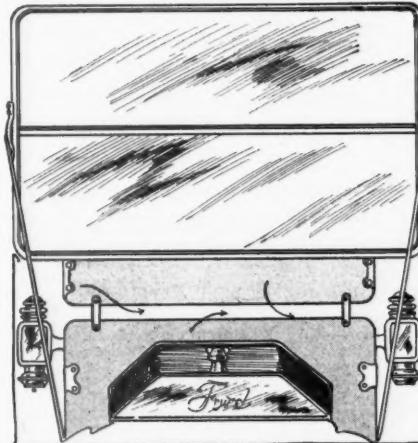


FIG. 1—READER VENTILATES FRONT COMPARTMENT OF FORD

the car to do this? Also how much would it be necessary to lengthen the drive shaft and housing? Would the lengthened drive shaft take more power than the way it is now? Would it take very much more power if I put on 3 1/2-inch tires in front and 5-inch in the rear?—A. S. Thompson.

It would be a very unwise step to attempt to lengthen the Ford chassis, for it would entail not only considerable expense, which would not bring sufficient returns, but would be quite a difficult matter and one which could not be done by

the average owner. Further, the car might not operate successfully under the conditions and the added weight would bring the fuel bill quite high. If a car is designed to carry five people or four or six, one should not expect to get good results and long life from the car if it is overloaded.

FRANKLIN HOLDS RELIABILITY

Los Angeles-Phoenix Race Won by Air-Cooler

Ray, Ariz.—What is the best time that has been made in the Los Angeles-Phoenix road race?

2—Who holds the record?

3—What are the rules of this race?

4—Does a driver and mechanician have to join the American Automobile Association to compete in this race? If so, what entry do they have to pay?

5—Has the amount of the prize been announced for the race this fall?—M. K.

1—The best time was made last year by a Franklin, Ralph Hamlin driving, the time being 18 hours 10 minutes 22 seconds.

2—The record is held by the Franklin driven by Hamlin, the average speed being 28.2 miles per hour.

3—The A. A. A. rules for road races hold good here.

4—Yes. The fee is \$2.

5—No.

E. R. THOMAS OWNS OLD FACTORY

Recently Purchased Plant Where Flyer Was Made—Speeds in Moline Gearset

Chicago—Editor Motor Age—How many forward speeds did the 1912 and 1913 Moline gearsets contain?

2—Is the Thomas factory operating under the receivership?

3—What is the speed of the Thomas 6-40?

—L. O. Fancher.

1—Both 1912 and 1913 Molines had three-speed gearsets.

2—The factory in Buffalo in which the Thomas Flyer was manufactured has just been bought back by E. R. Thomas. The manufacture of Thomas cars was discontinued some time ago. The present owner expects to lease the factory to some manufacturing concern.

3—Owners of this car have stated that it is capable of traveling between 65 and 70 miles per hour.

READER MAKES FORD VENTILATOR

Raises Windshield and Gets Good Draught When Car Is Moving

Beloit, Wis.—Editor Motor Age—The illustration in Fig. 1, showing how a Ford may be effectively ventilated, may be of value to many Ford owners troubled with the front compartment becoming excessively hot. The arrangement is very effective, especially on long drives. By removing the windshield clamps which hold that accessory in place, the bottom section of the windshield may be raised about 1 1/2 inches. After doing this, place the bolts which were formerly at the bottom at the top of the clamp and take the top bolts and place them at the bottom, as shown in the illustration. In tightening the bolts the top ones should be tightened as tension bolts first. When the car is in motion a strong draft is available and the front seat is very comfortable.—M. D. Leavitt.

WHERE IS THE GREATEST STRAIN?
Driving Pinion Takes Most of the Strain
When Wheels Are Pushing the Car

Salem, Ore.—Editor Motor Age—When going down grade and the car is set in low gear and traveling from 12 to 15 miles per hour and the ignition is cut off, where is the strain, on the engine, the transmission gears or differential? What is the per cent of strain?

2—How fast is it advisable to drive a car under such conditions?—E. W. Stensloff.

1—Most of the strain comes on the driving pinion and the extent of the strain is equal to the strain when the car is going forward, but the application is in a reverse direction. The clutch is not as severely taxed when the car is being propelled by the wheels as it has less work to do when operating that way.

2—At a controllable speed, so that the car may be stopped immediately if called upon to do so.

WHICH MOTOR IS MOST POWERFUL?

Valve-in-Head Design, T-Head and L-Head
Discussed at Reader's Request

Gypsum, Kans.—Editor Motor Age—Illustrate and give the relative power developed by T-head, L-head and valve-in-the-head four-cylinder motors. In considering which car to buy each dealer tries to explain why his is superior to the other. Now the valve-in-the-head people say the T and L-pockets in these motors consume the expansion of the gases at expense of power and the L and T-head people say the valve-in-the-head motor have no more power, in fact not as much as they have.—A. R. Manning.

The three types of cylinders you mention are shown in Fig. 2. The last one shown is the valve-in-head type, which is said to give more power for a given displacement than either of the other types, because its construction permits of the formation of a combustion space whose wall surface is smaller in proportion to its volume, than is the wall surface of the

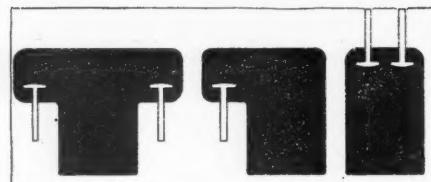


FIG. 2—WHICH DESIGN IS MOST POWERFUL?

T-head or L-head type. Next to the valve-in-head motor, insofar as power is concerned, comes the T-head, the first illustration in Fig. 2, which permits of the use of large valves. The L-head follows the T-head in order.

It should not be taken that any valve-in-head motor of given displacement is more powerful than any T-head of the same displacement, for there are so many other points of design which enter into the discussion that it is hardly safe to say it will be true in every case. An L-head motor of a certain size may be more powerful than a T-head of the same displacement, due to some point in the design of the rest of the parts.

INFORMATION ON TWO CASE CARS

Cadillac Weighs About 3,800 Pounds—
Rayfield Carbureter Data

Edgerton, Wis.—Editor Motor Age—How fast will the Case model 50 travel, fully equipped? How fast stripped?

2—What is the piston displacement of this car?

3—I use a Rayfield carbureter. Lately it has produced a peculiar wheezing noise when running idle. What is the cause?

4—What will the 1914 Cadillac weigh with two-speed axle and fully equipped?—A Reader.

1—The Case company is not manufacturing a model 50, the 1913 cars are called the models 30 and 40. Both are four-

cylinder cars capable of attaining a speed of over 60 miles per hour. When stripped the speed may reach 65 miles per hour.

2—The displacement of the 30 is 280.6 cubic inches and that of the 40, 334.0 cubic inches.

3—A wheezing noise in a carbureter comes usually from the air valve. Sometimes this noise develops into a whistle. It is due to the air valve remaining open a little when the engine is idle. This may be due to a poor adjustment or to dirt, which causes the valve to stick.

4—According to the Chicago agent this car weighs about 3,300 pounds.

WILL COLD WATER CRACK JACKET?
Not Unless Drop in Temperature Is Great and Cylinders Drained

Carey, O.—Editor Motor Age—If a four-cylinder motor should become sufficiently hot to boil over a gallon of water out of the overflow pipe, would it be advisable to stop along the road and fill the radiator with cold water?

2—Would there be danger of cracking a water jacket?—H. M. Patterson.

1—Yes.

2—Not unless the jacket is empty and hot is there any danger of cracking.

Silent Chains and Gears.

Springfield, Ill.—Editor Motor Age—Kindly give me the manufacturers of silent chain gears and chains for driving camshaft from main shafts.—J. L. Cook.

The following named manufacturers offer silent chains for driving camshafts: Link Belt Co., Indianapolis, Ind.; Peter A. Frasse Co., New York; Sareo Engineering Co., New York; Whitney Mfg. Co., Hartford, Conn. The following concerns make silent chain gears: Grant Gear Works, Boston, Mass.; Warner Gear Co., Muncie, Ind.; Ross Gear & Tool Co., Lafayette, Ind.

Comments on Cyclecar Construction by Motor Age Readers

WHY FRICTION DRIVEN CYCLECAR?
Is This Type Especially Applicable to Such Forms of Vehicles?

DETROIT, MICH.—Editor Motor Age—What are the advantages of friction drive in a cyclecar over the same drive in a big car? I notice a statement has been made that this form of drive is especially applicable to cyclecars. Why more so than on big cars?—Max Smith.

The disk and wheel can be smaller, while the inertia of the load in starting is much less. The smaller size of the wheels allows of a more rigid connection between motor and cross shaft without too bulky and heavy a casting, while the strain on the frame through the angular thrust of the follower wheel when on high is less on account of the smaller diameter. The high speed of the wheels also makes the outfit more efficient and lasting than with a slower speed motor. The use of belts in connection with the friction relieves the faces from sudden strain when the car is started, preventing the likelihood of flats in the friction wheel which can sometimes be made on rigid drives and big cars by careless drivers.

In either case the friction drive is efficient and very handy in practice, but with the cyclecar especially so for the reasons named.

READER COMMENTS ON DESIGN
Says Differential Is Not Essential—Disap-
proves of V Screen

Chicago—Editor Motor Age—I have noted with interest the various discussions relative to the cyclecar, with the result that I wish to offer my own opinions on the matter.

In the issue of July 17 Cyclecar gives an interesting account of the future of cyclecar, especially with reference to the seating of passengers. I will take the liberty to disagree with him in regard to side by side seating, with running boards inclosed. The narrow tread and consequent narrow frame would tend to tilt the body with only one passenger riding. It would also materially increase wind resistance.

He also advocates using a V-shaped screen in front of the hood, on the grounds that it decreases wind resistance. To my way of reckoning, the contrary is the result of this, as the V takes up more surface than a straight or flat screen. Were it a piece of sheet metal it would lessen resistance, but in this case it does not deflect the air. Another matter, the greatest wind resistance occurs in the pocket formed inside the hood. A sheet steel V placed directly aft of the motor would give the desired decrease in resistance.

I also wish to differ with reference to placing the gas tank in the cowl. Every ounce distributed over the rear wheels means that

much more traction, and if the tank be placed in the rear it will not alter the center of gravity, and gravity feed to carburetor will not suffer by the change.

A differential, while desirable where rigid drive is used, is not essential to the good behavior of the car. The clutch can be dispensed with also in friction or planetary drive. At least a well known maker of the latter form makes this statement.

With regard to belt or chain drive, this is a matter for discussion. Both have their advantages, and vice versa. Personally, I cannot see where belts take preference as far as cheapness is concerned, for if one compare the list prices of both, the chain will be found the less expensive, that is, of the type used on motorcycles. Sprockets also compare favorably with V pulleys.

True, the belt is the more silent, but owing to the large pulleys it is not practical to use fordoors, and the resultant high stepping is awkward for women passengers. Again, belt means lower suspension, obtainable by the outside drive, which is a desirable, in fact, a necessary feature on narrow-tread cars.

I should be pleased to see the exponents of both drives fight this out, as the settling of this question will hasten the development of the American built cyclecar materially.—A. E. Rylander.

Your views are interesting and in the main correct. In the matter of side-by-side seating and springing you are entirely right, but as to the V-shaped wind shield or screen this would have less wind resistance than a flat plate as the head resistance of the plate is changed to skin friction in the V-shaped construction. The

ideal shape is, however, that of a semi-circle, for winds do not always blow directly from the front. Also the cockpit or pocket behind the hood does not form the greatest wind resistance but the rear end of the car. The shape of the rear is of much more importance than that of the front end.

The tank in the cowl gives a direct feed to the motor even when climbing a steep hill. If placed at the rear a force-feed must be used with longer pipes. There will be plenty of traction on the rear wheels without the tank weight.

As to the chain-belt controversy, a thing which has long held in the motorcycle industry, this will continue indefinitely and there will be exponents and disciples of both, and both types undoubtedly will be made for many years to come. Either will do the work and do it well. It then is a question only of which the buyer prefers. One is quiet but expensive, the other noisy and cheaper, and when new more efficient, but both are fully to be trusted to do the work.

UNDECIDED AS TO BELT OR CHAIN

V-Belt Would Give Better Results on Reader's Cyclecar

Minneapolis, Minn.—Editor Motor Age—What are the advantages of belt and chain and the disadvantages of each for cyclecar work? I am undecided as to which to fit in a cyclecar and would like the advice of Motor Age. I am using ordinary sidecar wheels and a 7-horsepower twin motor out of my motorcycle, which was chain-drive. The machine is to be tandem type with 96-inch wheelbase, and 36-inch tread.—J. H. T.

For the layout you mention a V-belt drive probably would prove most satisfactory. The reasons for this may be had from an analysis of the advantages of each type. The chain is more efficient than belts, but noisier, but on this score either is good. The limiting element in your car is the length between the motor and rear shaft in your tandem 96-inch car. A chain of that length, or half that length, to a countershaft under the front seat, would be too long for best results, and with the swinging and side-slap effect would get noisy and climb in a short time. Chains are excellent—probably the most efficient drive there is, when centers are not too far apart, and sprockets not too small, but wear makes them noisy and takes away their efficiency.

With your car, with chain, to get each one short enough, you probably would need two countershafts and three chains. This would not be advisable. In a side-by-side seater with short wheelbase the chain would probably be better than belt.

With belt, as shown in Fig. 3, you can use a short chaindrive from motor to countershaft. The belts may be very long and pass around large pulleys, a big advantage, for the longer the belt the better it holds and the longer its life. The dotted example of a short motorcycle drive in Fig. 4 shows the smaller arc and hence greater belt pull needed to get traction. With the long centers the arc of contact is large, the tension of the belt less, and the belt is bent a less number of times per mile. Also each belt has less pull on it by one-half than on a motorcycle.

With chain or belt no differential need be fitted with a 36-inch tread car, but the belts will give a real differential action while the chain will not.

TWIN MOTOR FOR CYCLECAR USE

First Cost Coupled with Performance Make It Preferable

New York—Editor Motor Age—What type of motor is used for cyclecars abroad? What is best for cyclecar work here? Is not a four-cylinder better than a twin?—Peter O'Rourke.

Europe is fast adopting the 90-degree twin motor for cyclecar work. This is a cheap motor to build and the advantage claimed over other V motors is that it can be balanced as well as a four-cylinder and will give more power for the weight. If a four-cylinder motor is used it will need to be water cooled, and this is almost prohibited on cyclecars on account of road vibration, on our type of roads. A blower-cooled motor might be used, but the first cost of the twin or four is so greatly different that the twin cannot but be preferred. On first cost and performances abroad the 90-degree twin seems to be the future cyclecar motor.

No Cyclecars Deliveries

Council Bluffs, Ia.—Editor Motor Age—Will you please give me the names and addresses of the firms now producing cyclecars in America. I want to purchase a cyclecar if I can get one that is satisfactory and at a reasonable price. I would prefer the tandem or French type body. I would want the power plant to be a 9 or 10 horsepower twin with mechanical oiler and a two-speed gear.—J. T. M.

There are as yet no firms we know of actually delivering cars. You might write, however, to the Economycar Co., Indianapolis, Ind., the Imp Cyclecar Co., Auburn, Ind., and the Downing-Detroit Motor Co., Detroit, Mich. These are making tandem types and the first two firms have cars on the road.

DATA CONCERNING CYCLECAR TOUR

Around-Lake-Michigan Run Limits Weight

Only—Not Displacement

Cleveland, O.—Editor Motor Age—Will you kindly advise me as to the rules which define a cyclecar in America? I understand that the Around-Lake Michigan tour limits the size, etc., but think the motor I have in mind is too big. What is the motor limitation on this run? What is the average daily mileage to be required?—F. R. H.

The cyclecar has as yet no official definition in America, though it was intended at the start to adopt the European ruling of 671 pounds weight and 67.15 cubic inches cylinder capacity. It then was found, how-

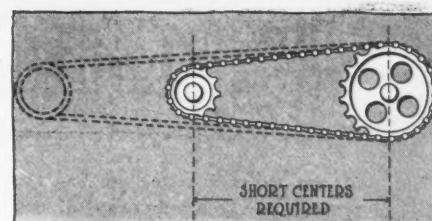


FIG. 4—CHAIN-DRIVE LAYOUT
This type needs shorter distance between centers due to the slap of the chain

ever, that not one of the three American cyclecar motors came within the definition, these being built to about a 71-inch size, so that the run around Lake Michigan has been made a free-for-all, with the limiting weight only at the European figure. It is probable that all of the entries will have motors of about the same size, either Mack, Spacke or Wizard products. It is probable that the 71-inch rule will be the eventual definition, as for America more power is needed for road work than abroad, and since the makers so far have adopted this size among themselves before a definition was announced.

The cyclecars are to cover 1,200 miles in 6 days; an average of 200 miles per day, for the most part over very poor roads. The rules are the same as for the big cars except for motor stops, which are allowed at any time.

CURED BELT JUMPING FROM PULLEY

Car Now Will Take Sharp Turns with the Brakes Set

Chicago—Editor Motor Age—I had trouble in making my belts stay on the pulleys when taking corners fast when I first took my tandem cyclecar out and perhaps some other users may have had the same trouble and have wondered the reason. Mine I cured by pulley adjustment.

The belts on my car are very long and, as a result, hold very tight, and my motor has more power than I have been able to use as yet on any road. To get the most car speed I had adjusted my pulleys so the belts ran outside and even with the outer edge of the pulley, as one would have them on a motorcycle. Every time I turned a corner short the outer belt came off. I wrote to the factory, and in return was informed that if I adjusted the pulley flanges wider apart to let the belt drop into the pulleys about $\frac{1}{4}$ inch I would have no trouble. This I did, and watching the belts on turns saw why, for the change cured the trouble entirely. I can now turn sharp curves with the brakes set.

Doing this, and watching the belt pulley in front the outer belt is plainly seen to climb up on the V pulley to a larger diameter, still pulling, and taking up all lost motion. Thus, both belts pull on a curve, and the outer one faster than the inner, which is right. This change has lowered the gear ratio of my car somewhat, but I have more speed than I can use anyway.—Enthusiast.

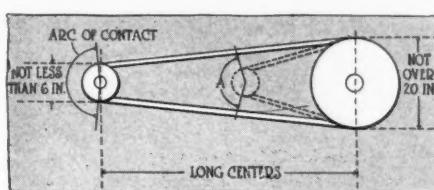


FIG. 3—BELT-DRIVE LAYOUT
This type requires large pulleys and long distance between centers—This drive is quiet

The Motor Car Repair Shop

IT is not always that an owner has the good fortune to be able to use shop implements, either because the garage in which he is housing his car has none, or if it has they are being used by one of the workmen. This happened to be the case recently with an owner who was overhauling his car and wished to grind some piston rings. The surface plate used usually for this sort of work was in the hands of one of the garagemen, and there was no other nearly flat surface about the shop.

However, the following method was devised, which made a very suitable surface plate, as the results showed. The windshield of the car was folded half way down, as shown in Fig. 1, and upon the shield was placed a full sheet of fine emery cloth. The piston ring was then gripped, as shown in the upper portion of Fig. 1, and rubbed over the surface of the cloth until the required amount of metal was removed.

The only difficulty encountered was that some of the emery dust made its way under the sheet, with the result that the glass of the windshield was cut slightly. To overcome this difficulty there was fastened a big sheet of cloth to each side of the emery paper. This cloth would catch the dust and at the same time would not interfere with the operation of grinding, as no part of it would get under the emery cloth.

Filing Connecting Rod Shims

Very often the lower rod bearing of a connecting rod will become loose and it then becomes imperative that the shims between the bearing halves be filed and the bearing taken up. In a number of instances the shims are removed, placed in a vise and filed, just as an ordinary piece

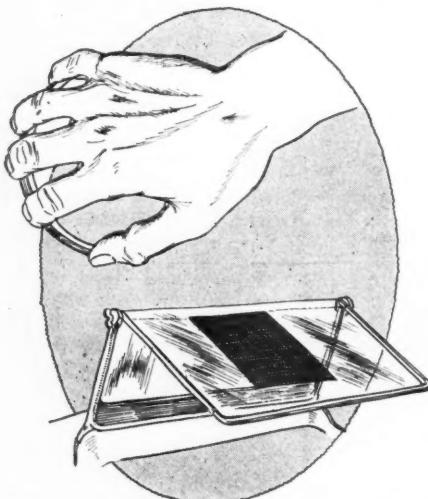


FIG. 1—METHOD OF GRINDING PISTON RINGS

The windshield is used instead of a surface plate care being taken that no grains of emery get onto the glass and cause scratches to appear—Upper illustration shows how the ring should be held against the emery cloth

Grinding Down Piston Rings

of metal is filed. This method leads to inaccuracy and sometimes gives disastrous results, for the shims in most cases are filed unevenly and more metal is taken from one than from the other.

A handy tool for facilitating the filing of one-piece shims is shown in Fig. 2. It is called a shim block and may be made by a good carpenter at small cost and in a short time. To make this block the shims are placed on the wood and outlined. Everything within the outline, but the places for the shim holes, is cut away as shown. The cutting should not be too deep, the exact depth to be about half the thickness of the shim. The buttons for the shim holes should be cut down the same amount.

Proper Place for Removed Parts

With this shim block both shims are filed at once and there is little danger of making an uneven surface. The shims are placed in the grooves cut out for them and a file run over at an angle, the file being held firmly at both ends.

When removing a carburetor or magneto or any other part of a motor, the novice invariably will take the nuts and bolts and place them anywhere on the chassis but the proper place. Often the carburetor flange bolts will find themselves in the web of the crankcase or on top of one of the cylinders or on the work bench.

If they are left on the bench, they may be picked up and thrown into a box of odd nuts and bolts. If left on the running-board or inside the frame channel, etc., they may drop down on to the floor and be swept up and out, at any rate when the time comes to replace the carburetor they will be missing.

The proper course would have been to screw these nuts back onto the studs on cylinders of the motor, each nut on its respective stud. Considerable time is lost in looking for misplaced nuts and bolts, and then some more in finding and fitting other ones in their places. The repairman, therefore, will save himself much time and trouble by cultivating the habit of keeping all motor parts together in a systematic and orderly way.

Many repairmen think they are very careful in this way when they provide boxes for nuts and bolts and then, put a great many different kinds of nuts and bolts together from various parts of the car. This of course is better than putting them in any place about the chassis that happens to be handy when they are removed, but even with one box for all nuts, etc., much trouble often is experienced in finding the proper nuts, bolts and screws for certain places. Very often it is

found that of two bolts removed from certain places close together, one bolt may be a little longer than the other and for a very good reason, and while apparently of the same size the nut of one bolt will not fit well on the other bolt, etc. Hence, if precautions are not taken to get these bolts back in their respective places, and the nuts on the bolts to which they belong, much trouble may result just from the removal of two nuts and bolts.

In removing the lower portion of a motor crankcase usually there are many nuts and bolts of similar size to be removed. It is well therefore, to provide a separate box for these alone; and to start each nut onto its respective bolt before throwing them into the box. It also is well to be on the lookout for special nuts or bolts, such as bolts with one side of the heads partly filed away for clearance, or inverted bolts, or other special fittings. It is necessary to make note of these things and take precautions to get such pieces back in the way in which they belong, otherwise much cursing, and annoyance may be experienced later.

Repairing and Clean Fingernails

No matter how careful a workman may be, he will get dirt under the fingernails while repairing a car. A good method of making this dirt easily removable later is to take a piece of soap and scrape the surface of it with the nails, thus getting some of the material underneath. Later, when the hands are washed, the dirt will be removed easily with the soap which will be dissolved by the water. The use of gasoline or kerosene for cleaning the hands has been found to injure the skin.

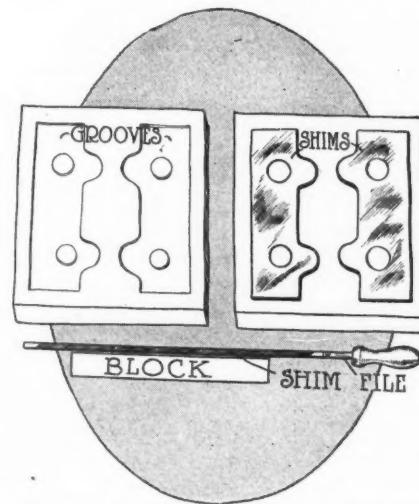


FIG. 2—SIMPLE DEVICE FOR FILING SHIMS

With this the shims are held firmly in place and there is little chance for uneven filing. The blocks are made of wood and the surface of the grooves shown, as nearly level as possible—The file should be held flat as shown



The Motorist's Kindergarten



EDITOR'S NOTE—Motor Age is publishing in this department a series of non-technical explanations of the various parts of motor cars for the benefit of the reader who knows nothing about them. The subjects will be dealt with in the most elementary manner, so that the series when completed will form a simple elucidation of the car.

STOPPING a motor car is done by mechanism which is just as important as that which makes the car move forward and the part which breaks the speed of a car or stops the car, is known as the brake. Before going into the construction of brakes let us dwell for a while on the location of them, and the different types in common use.

In the majority of motor cars the method

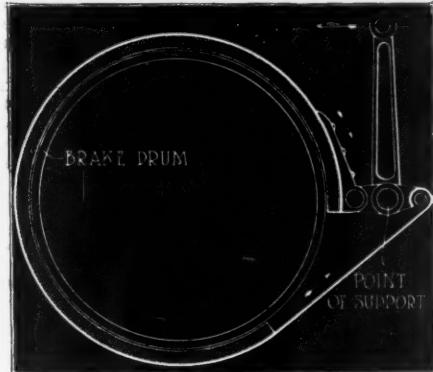


FIG. 81—TYPE OF EXTERNAL CONTRACTING BRAKE

The arrows in the illustration show the direction the different parts will follow when the lever is pulled by the rod attached to the brake pedal—Note that here the brake band is outside of the brake drum

of stopping and slowing down consists in removing the power from the driving wheels, this being obtained by throwing out or releasing the clutch, and then applying the brakes. On most vehicles these brakes are located at the rear end of the car and act on the driving wheels. However, there is another type of brake which is situated on the clutch shaft instead of the rear wheels and this, with the other, will be taken up in detail in this article.

There are two types of brakes in common use called foot brakes or service brakes, and hand brakes or emergency brakes. The former type is operated by a foot pedal and the latter either by a lever or pedal. Besides being either foot or hand brake, another classification is made according to the method of brake action. There are two such classes called internal expanding brakes and external contracting brakes. The foot brake usually is, although not always, of the external contracting type, and the hand or emergency brake of the internal expanding type.

Let us examine the construction of the foot brake of the external contracting type, which is shown in Fig. 81. The brake itself consists of a band of metal

Types of Motor Car Brakes

over which has been placed some non-burn material such as asbestos. This, however, wears rapidly, so instead materials called raybestos, etc., which are made of

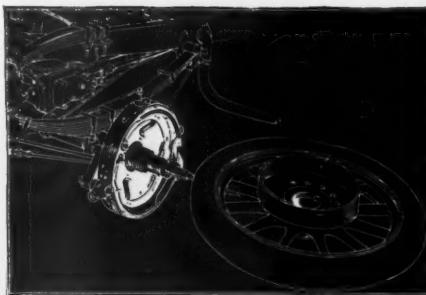


FIG. 82—THE LOCATION OF THE BRAKING SYSTEM

Placed on the rear axle casing as shown—the brake drum D fits between the foot brake and hand brake so that both may act upon it one from the outside and the other from the inside

asbestos and wire, are used. The brake proper then is a band and is referred to in motor car parlance as a brake band. This band fits over what is called a brake drum. This drum is fastened to the wheel of the car as shown in Fig. 82 at D. When the wheel revolves the drum turns around, but the brakes remain still. It will be noticed by referring to Fig. 81 that one end of the brake band is fastened to a lever, the point of support being marked. The other end of the band is fastened to the same lever by a long rod as shown. The end of the lever is connected by a rod with the pedal on the footboard of the car, called the foot-brake pedal.

When this pedal is pushed forward the brake lever is pulled in the same direction usually, although sometimes the other way. The arrow in the illustration shows its direction in this case. When the brake lever is pulled forward, however, one side of the brake band is pulled downward over the brake drum and the other side is pulled upward as shown by the arrows. This means that the brake band rubs against the drum. If more effort is applied to the brake pedal on the footboard then the more severe is the rubbing of the band against the drum and hence the car stops sooner. In other words, it is the friction of the brake band against the drum of the wheel which brakes the speed of the car. We get the name external contracting from the fact that the band is on the outside of the drum and it contracts.

There is another type of brake which although not used very much in ordinary service, is well-called the emergency brake. Not all emergency brakes are built on the same principle, still a great number of them appear as shown in Fig. 83. Here the bands are made of metal only. This does not mean that all such brakes are made of metal without facing, but on most of the



FIG. 83—A COMMON FORM OF EMERGENCY BRAKE

The cam is shown spreading the brake bands apart and thus causing them to press against the drum which retards the speed of the car—Note that here the brake bands are inside the brake drum and expand

prominent makes is seen the type without asbestos or raybestos facing.

The operation in this case gives the same result as obtained with the service brake, but the mechanism is different. It will be noticed the brake band is in two parts, each one being hinged. Between the free ends of the bands is a cam as the illustration shows. This cam has an extension which is attached to a pedal or lever as the case may be. When the car is running and the brakes are not applied the cam is lying flat, but as soon as the lever is pulled the cam rises as shown in Fig. 83. This pushes both bands upward which causes them to press against the brake drum which is attached to the wheel. Hence the speed of the car is retarded. In this case it will be noted the brake bands are inside the drum and they expand, from which we get the name internal expanding brakes.

The operation of both of these brakes usually is by means of pedal and long rods, but one type which does away with the long rods is located on the clutch shaft, and the same pedal which operates it throws out the clutch.



From the Four Winds



TROPHY for Seattle Tour—The Seattle Post-Intelligencer has offered a handsome perpetual trophy for a reliability tour, which will be under the auspices of the Automobile Club of Seattle. Secretary Fretwell has taken the matter up with the A. A. A. and at a meeting to be held in Seattle soon the details of the run will be arranged.

Des Moines' Fire Horses Passing—The Des Moines city council last week started to motorize the fire department of the city by placing an order for \$72,000 worth of motor driven apparatus with the American-LaFrance company. Twelve trucks are in the first order and later the entire department will be rid of horses.

Cars Crowd Cattle from Ships—So great has been the demand for shipping space for heavy shipments of Canadian built motor cars to England, that cattle have been chased off the decks of the ships plying between Montreal and London and Bristol. The shippers can obtain space if they want to pay the price. Local cattle shippers declare, however, that the heavy output of cars has resulted in a demand for higher

Good Road Brevities

THE Lake-to-River Road Association, founded in Milwaukee a year ago to mark a principal highway from Milwaukee, on Lake Michigan to two distinct points on the Mississippi river, both branches starting at Madison, the state capital, has completed the work on the Northwest route, which is from Milwaukee to St. Paul-Minneapolis by way of Madison and LaCrosse. The mark used is a St. George's cross in red on a white band around every fifth telephone pole in the country districts and every other pole in cities and villages. The branch from Madison to Prairie du Chien is now being marked, and the Chicago-Milwaukee road will be next on the program.

For the purpose of improving the roads of Ingham county, Mich., it is being planned to buy a stone crusher next year. This would save the county long hauls on crushed stone. Jackson county already has begun the use of its own stone crusher.

One of the largest and most complete road exhibits ever put on in Kentucky will be made at the State Fair at Louisville, September 15 to 20. It will consist of road models from the 1,000 square feet of floor space and will show each and every character of road in different stages of completion, and models of the most modern and up-to-date machinery for building roads. There will also be types of culverts, sub-soil drainage and other features of road building. There will also be given daily an illustrated lecture by a representative of the national department at Washington.

Cass county, Ill., which has for years known anything but good roads has at last decided to pull itself out of the sand and put a proposition to the voters to sanction a bond issue of \$250,000 for good hard roads. If the good roads advocates are able to pull enough votes at the election, 46 miles of either cement or crushed stone roads are to be built at once. Considerable opposition is being met with from those who are off the contemplated roads but it is expected this opposition will be overcome by the fact that the city of Beardstown will absorb the greater part of the bond issue responsibility. The roads will connect the important towns and villages in the county.

rates for cattle space, and that it pays them better to send their cattle through New York than from Montreal.

State Motor Show Popular—Secretary J. C. MacKenzie, of the Wisconsin State Board of Agriculture, declares the first state motor show, which will be part of the 1913 Wisconsin State Fair at Milwaukee, September 8 to 12, will undoubtedly be a great success, judging from the large amount of space taken by dealers and factories. The board is considering the now urgent necessity of providing additional room in other than Machinery Hall, which is set aside for the display.

Gets First Badger License—The Hokanson Automobile Co., of Madison, Wis., is the first to file application for dealer's registration and license for 1914. The application and \$10 fee required under the new motor code has been deposited thus early so the Hokanson cars will again carry tag No. 1W in 1914. This concern has been given No. 1 since 1905, when licensing and registration fees first were required. The secretary of state has just issued 1913 license number 33,000 and applications are coming in at the rate of 50 a day.

Baby Born in Motor Car—Mr. and Mrs. Edward Burrows, of Fairbury, Ill., are the parents of an up-to-date baby girl which has the distinction of being born in a motor car. It was anticipated that the stork would arrive at the hospital and Perry Keck, of Fairbury, was asked to convey Mr. and Mrs. Burrows to the Fairbury hospital in his Ford. The stork's arrival was somewhat premature, the baby being born while enroute to the institution. Neither mother nor babe experienced any ill effects from the experience.

Motor Show for Eau Claire—Dealers at Eau Claire, Wis., have a prospect of a big motor show, which has been something of an impossibility because of the absence of a suitable building. The Eau Claire Auditorium Association has been organized with \$50,000 capital to erect a large brick and steel structure for convention and exhibition purposes and dealers are already making tentative plans for holding a monster show that will be representative of the great northwestern Wisconsin territory. W. K. Coffin, a well-known motorist of Eau Claire, is president of the new association.

Motor Runs City Boosters—In order to promote the business interests between Wilmington and the upper part of the state of Delaware, and also to boost the state fair, which will open at Wilmington, September 9, the Chamber of Commerce has planned a monster motor car run from Wilmington to Dover and return, to be taken on September 4. Stops are to be made at all of the principal towns. In the same manner the Chamber of Commerce a few weeks ago toured the southern part of New Jersey with a view to drawing business to Wilmington. The venture has proved a success.

Youthful Motor Pilot Busy—That a keen-witted small boy may make a good living by serving tourists as a pilot is evidenced from the case of a Connecticut youngster who a few days ago came into New London riding on the running board of a car after having shown the owner the route from New Haven. It is the boy's practice to loiter about the lobby of the Hotel Taft in New Haven and make known his road knowledge to such of the motorists as care

for a guide. The boy knows the roads from New York to Boston by way of the shore line. He has done well at his trade this summer as most of the motorists passing through New Haven for Boston have gone by way of the shore roads.

Plan Inter-City Motor Run—If present plans are carried out, the Louisville Automobile Club and the Cincinnati Automobile Club will both participate in a sociability run to be held next month. The plans are for both organizations to arrange for a run and start out on the same day meeting at some half-way point for a joint banquet and meeting in the interest of good roads.

Hill Climbs at Oneida, Ill.—The annual motor car day at Oneida, Ill., this year will be September 10. The city will be in gala attire and there will be prizes for the best decorated cars, a parade being a feature of the morning's program. Three hill climbing contests for variously classed cars will be a feature of the afternoon. Many other features appealing to car owners will be arranged and it is hoped to eclipse all previous events of this kind.

Recent Club Activities

THE Davenport Automobile Club, of Davenport, Ia., has pledged itself to build 18 miles of road from the western borders of Scott county through Davenport, Rock Island, Moline and Watertown, if the Lincoln National highway shall be routed through the tri-cities and has also assured the construction of a concrete highway for a distance of 55 miles from Watertown to Sterling via the Rock River Valley route. This is the largest project that has ever been undertaken by the Davenport Club.

M. T. Kennedy, of Davenport, Ia., has been appointed field secretary of the Iowa State Automobile Association and has begun the work of organizing clubs in those cities and towns where there have been no clubs up to the present time.

The Lansing Automobile Club, recently organized in Lansing, Mich., has decided not to confine its activities to local residents but will welcome to its membership motorists from neighboring counties. The club is planning to build a new clubhouse next spring on the property recently purchased at Pine Lake, 9 miles east of Lansing.

E. L. Ferguson, official pathfinder for the all-Southern ocean-to-ocean highway, has convinced New Orleans owners and dealers that the project he represents is feasible. The pathfinder was welcomed warmly on his arrival at Milneburg, where a large number of cars were waiting to form a parade into the city. Despite the hospitality shown, it must be said, that most of those interested were sceptical as to the possibility of the success of the proposed road.

Hundreds of motor cars from all parts of Mississippi were driven into Jackson Aug. 27 to take part in the good roads parade. Each town's delegation was kept together and indicated by placards. Clarksdale, Oskyka and Meridian had the largest representations. En route to the capital the different touring parties report that they were received enthusiastically at the small towns, where good roads speeches were made. This demonstration for better highways is expected to have a direct influence on the vote, soon to be taken in many counties for increased funds for road improvement.



Among the Makers and Dealers



BERDON Leaves Esterline Co.—The resignation of A. E. Berdon as chief engineer for The Esterline Co., Indianapolis, Ind., has been announced. Mr. Berdon has not announced his future plans.

Connolly Maxwell Traffic Manager—L. R. Connolly of Chicago, for several years in the traffic department of the International Harvester Co., has been engaged as traffic manager of the J. D. Maxwell Motor Corp., and enters upon his new duties at Indianapolis September 1.

Another Office For Handley—J. I. Handley, president of the J. I. Handley Co., of Indianapolis, has become president of the New York American-Marion Sales Co. He succeeds Charles E. Riess who resigned recently to become identified with another company.

Kenosha After Tire Factory—The Commercial Club of Kenosha, Wis., is negotiating with a large Chicago concern, manufacturing pneumatic and semi-pneumatic tires for pleasure and commercial cars, to move its plant to Kenosha. It is said there is a strong likelihood that the removal will be accomplished.

Ramey Lozier Southern Manager—Sales Manager Paul Smith, of the Lozier company, has announced the appointment of Robert R. Ramey, as southern district manager for the Lozier, with headquarters at New Orleans. Mr. Ramey will assume his new duties at once, having already left for the south.

Thomas Buys Old Plant—Edwin Thomas, formerly identified with the E. R. Thomas Motor Co., has purchased the building at 1192 Niagara street, Buffalo, and is converting it into a plant for the manufacturing of light cars. The building is especially fitted for this purpose and the Thomas six was manufactured there for many years. Mr. Thomas is willing to rent this property to parties for light manufacturing of cars.

General Motors Plant at Owosso—Following the recent demand of the mayor of Owosso, Mich., upon the General Motors Co. for the return of \$25,000, given as a bonus for the establishment of the Reliance motor truck plant here, officials of the General Motors Co. have stated that the plant recently vacated by the Reliance company, which removed to Pontiac, will be used by some other branch of the business of the General Motors Co.

Building Addition for Stockroom—The Muskegon Motor Specialties Co. is at work on an addition to its present plant and it is expected the addition will be completed within the next month. The addition comprises a brick, concrete and steel building, 65x75 feet, and will give the company about 5,000 additional feet of floor space. It will be used for stockroom purposes, the present stockroom facilities of the company being inadequate.

Allot Space September 5—Secretary Robert E. Lee, of the St. Louis Automobile Manufacturers' and Dealers' Association last week mailed out the plat showing the exhibit places available for the seventh annual motor show, Forest Park Highlands, October 6-11. The area to be covered by the exhibit is 35,464 square feet, exclusive of the open air space, where the trucks will be exhibited or the space set aside for accessories. The space is divided into eighty-four plots, which will be sold at the rate of forty cents a square foot. Truck space will cost \$25. Three spaces will be allowed each ap-

plicant who must apply before noon September 1. Space allotments will be made September 5.

Cincinnati Dates Set—The annual show of the Cincinnati Automobile Dealers Association will be held at Music hall on the old dates, as the last couple years, February 22 to March 5.

Change in Steel Tank Company—The Freeland Steel Tank Co., of Portage, Wis., has passed into the control of F. L. Van Epps, who has purchased the interests of his brother-in-law, L. D. Freeland, founder of the works. Mr. Freeland will take a rest and may locate in Canada.

To Build Four-Wheel Drive—N. C. Miller and son William, of Dodgeville, Wis., have purchased buildings and factory site and will engage in the manufacture of farm implements and machinery, at the same time preparing to market several important inventions of motor car parts. The Millers have valuable patents on a four-wheel drive, a universal joint and a differential set which are now being perfected. A garage and agency business will be conducted as part of the manufacturing business.

Reorganize Body-Building Company—The administrative and executive departments of the Racine Manufacturing Co., Racine, Wis., metal and wooden motor car bodies, have been reorganized and an active campaign covering the entire country is under way. Frank K. Bull, who also is president of the J. I. Case T. M. Co., Racine, has retired as president, being succeeded by C. A. Hamilton, until now vice-president of the Lavigne Gear Co., Racine, and formerly with the Wisconsin Engine Co., Corliss. Mr. Bull was unable to devote as much time to the

body plant as desired because of his other large interests. W. F. McCaughey, of Racine, has been elected vice-president. Harold Smith continues as secretary and George Jaegers as treasurer. Several changes are being made in the operating department.

E. N. Sanders Promoted—E. N. Sanders, formerly manager of the Moon Motor Car Co. of Illinois, has been promoted to western sales manager of the Moon Motor Car Co., having complete jurisdiction over the sales in the states lying west of the Rocky mountains.

Gemmer Has New Starter—George A. Gemmer, who retired from his active duties with the Gemmer Mfg. Co. about a year ago, has developed a motor starter using compressed air as the source of energy. A \$200,000 company to market the device has just been incorporated under the name of the Gemmer-Detroit Starter Co. L. W. Smith, is associated with Mr. Gemmer in the new concern.

Barney Everitt Builds Car—Barney F. Everitt, formerly an executive head of the E-M-F and the Metzger companies, is carrying an extensive experimental work in developing a new car which has been designed under his direction. Nothing definite has been done as yet toward putting this car on the market, as it is Mr. Everitt's intention to give the model a very thorough testing before he and his associates make any decision as to entering the manufacturing field. The first car which is now being built is a five-passenger model with a four-cylinder motor. It is a car which if put on the market will sell in the medium-priced class.

Recent Incorporations

Aberdeen, N. C.—Auto Motor Car Co., capital stock, \$10,000; incorporators, Henry A. Page, Sr., Henry A. Page, Jr., R. J. Cochran, W. A. Vlue and others.

Boston, Mass.—Somerset Garage Co., capital stock, \$15,000; incorporators, John J. Shea, L. Clerier, E. F. Gleason.

Bronx, N. Y.—Fordham Auto Van Co., capital stock, \$5,000; incorporators, John Forbes, Catherine Kelly, Louis Bissinger.

Brooklyn, N. Y.—South Brooklyn Garage, capital stock, \$5,000; incorporators, Hal. C. Washburn, Chas. Bestelmann, August W. Rath.

Columbus, O.—Central Auto Vehicle Co. of Columbus, O., capital stock, \$10,000; incorporators, John K. Kennedy, S. A. Webb, Clarence M. Addison, Wilbur R. Benoy, Allie W. McLaughlin.

Detroit, Mich.—LaBell Funeral Motor Car Co., capital stock, \$25,000; incorporators, Alex LaBell, Theodore C. Betzoldt, Maxwell W. Benjamin.

Detroit, Mich.—Automatic Muffler Mfg. Co., capital stock, \$15,000; incorporators, Wm. J. Griffith, T. P. Sherman, S. D. Callender.

Farmington, Mo.—St. Francois Motor Co., capital stock, \$4,000; incorporators, Martin L. Clardy, Jr., R. P. Lang, Carlisle E. Rozler.

Flushing, L. I.—Havana Motor Omnibus Co., capital stock, \$1,500,000; incorporators, Alex S. Andrews, Ralph S. Hull, Ralph A. Gamble.

Gulliford, Me.—Tire Buyers, capital stock, \$600,000; incorporators, Henry Hudson, James H. Hudson.

Herman, Wis.—The Town Herman Auto Transit Co., capital stock, \$8,000; incorporators, William Grosshuesch, August Frome, Jr., W. F. Buscher.

Jefferson, O.—Jefferson Auto Co., capital stock, \$6,000; incorporators, H. W. Paul, J. N. Held, C. J. Puerner.

Louisville, Ky.—Reid Auto Co., capital stock, \$5,000; incorporators, A. E. Reid, Alta Reid, W. G. Clapp.

Lynn, Mass.—Eastern Avenue Garage, capital stock, \$10,000; incorporators, W. H. Beede, Wm. J. Meloy, F. E. Smith.

New York—Liverani-Lombardi Motor Co., capital stock, \$20,000; incorporators, Arthur P. Marr, Jos. Liverani, Francesco Lombardi.

New York—George H. Kusel & Co., capital stock, \$1,000; incorporators, Geo. H. Kusel, Adolph Harnischfeger, Patrick O'Keefel.

New York—Frederick Smith Sales Co.; incorporators, Alanson P. White, A. H. White, Harry Wolkof.

New York—S. & K. Tire Co., capital stock, \$10,000; incorporators, Jas. J. Coomer, Herman Senner, Bernard J. Kaplan.

New York—H. C. Well Perfect Motor Co., capital stock, \$25,000; incorporators, H. C. Well, M. M. Well, F. A. B. Meinhardt.

New York—Automobile Pedal Pad Co., capital stock, \$10,000; incorporators, Henry Reich, Edgar M. Lichten, G. Thomas Young.

Philadelphia, Pa.—S. & T. Auto Co., capital stock, \$25,000; incorporators, Agnes Sattler, George T. Sattler, Robert D. Hughes.

Pittsburgh, Pa.—Chester Rubber Tire & Tube Co., capital stock, \$250,000.

Providence, R. I.—Hudson Sales Co., capital stock, \$10,000; incorporators, Levi B. Lorimer, John J. Rosenfeld, Robert W. Powers.

Raleigh, N. C.—Alta Motor Car Co., capital stock, \$10,000; incorporators, H. A. Page and others.

Rochester, N. Y.—Rochester Motors Co., capital stock, \$300,000; incorporators, Edward F. Davison, E. A. Grenelle, Albert H. Stearns.

St. Louis, Mo.—Palmer-Meyer Motor Car Co., capital stock, \$100,000; incorporators, Chas. W. Palmer, Frederick Meyer, Ferdinand A. Meier.

Springfield, Mass.—Martin Tractor Co., capital stock, \$350,000; Harry G. Fisk, C. H. Martin, E. D. Sutton, C. E. Beckwith, S. S. Eveland.

Toledo, O.—Toledo Co-Operative Garage Co., capital stock, \$10,000; incorporators, Harry L. Steffins, Beatrice Rose, Edna A. Schramm, Herbert Felker, John Felker.

Utica, N. Y.—H. W. Skinner Motor Car Co., capital stock, \$5,000; incorporators, Harry W. Skinner, Edmund C. Richards, David C. Comstock.

Wethersfield, Conn.—J. M. MacDonald Co., capital stock, \$10,000; incorporators, Ralph D. Britton, Sadie M. Lynehan, James M. MacDonald.

Wilmington, Del.—American Cycle Car Co., capital stock, \$50,000.

Off With Accessory Makers

Gallagher Carbureter

THE Gallagher Carbureter Co., Inc., New York, has brought out its 1913-1914 carbureter, illustrated in Fig. 1. This carbureter is of the mechanical type, that is, the movement of each part is controlled by the driver and not by the engine suction; but in this model there have been incorporated several improvements of detail, especially the float adjustment, and also the auxiliary air device which, according to the driver's wish, is made to supply hot air, cold air or a suitable proportioned mixture of both; there is also the option of entirely shutting off the auxiliary air supply.

The fundamental principle of the carbureter, which has been continued for this year, is illustrated in Fig. 1 at the right. The throttle, instead of being formed as the conventional butterfly, is a vertical, rotatable sleeve valve stationed in an extension of the carbureter housing and operated by a link connection from the throttle rod *T* which is wired to a dash control. The gasoline enters the concentric float chamber by way of an inlet *G*, which is controlled by a needle linked through *S*1 and *F*1 to the copper float *F*. The vaporization of the fuel is obtained by two nozzles supplying a high-speed jet *H* and a low-speed jet *L*. The screw *B* serves for adjusting the low speed and *A* for the high speed jet. The needle *H* of the latter is pinned to a sleeve which fits into a screw-threaded guide, so that if the sleeve is turned the needle valve is raised or lowered, thereby opening or closing the nozzle it controls to a varying degree.

To permit of adjusting the level of the float to the various temperatures and moisture contents of the air, the cap which covers the head of the screw *S* is removable, making access to *S* possible. The screw is fitted into a locknut *S*1 and carries the needle *N* at its lower end. By turning *S* while holding *N* to its seat, the locknut *S*1 may be raised or lowered, resulting in a

corresponding movement of the float *F*.

The auxiliary air adjustment consists in a metal angle fitting into a cylindrical valve cage which forms an expansion to the lateral extension of the lower part of the housing. If the point *E* of the valve is brought to the point *A* of the housing extension, nothing but hot air—which is taken through a pipe mouth attached to the exterior of the exhaust pipe—enters, while bringing *E* over *B* supplies cold air only. Between these two positions, mixtures of hot and cold air are supplied, while, if the valve is in the position here shown, the auxiliary supply is shut off entirely.

Doxameter Gas Saver

The Doxameter shown in Fig. 2 and manufactured by the Doxameter Co., Chicago, is in principle an auxiliary air valve consisting of an air cylinder containing a hollow, perforated piston, and of a *T* member, one end of which is closed and the other threaded into the intake manifold. The device is mounted horizontally, this

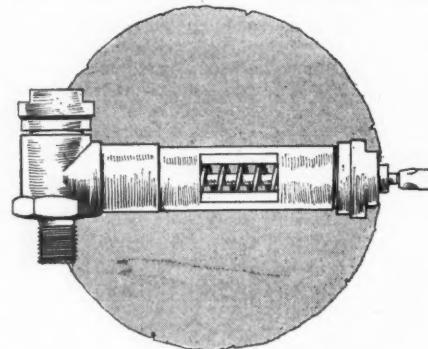


FIG. 2—DOXAMETER GAS SAVER

applying to the axis of the *T* member as well as to that of the cylinder. A spring behind the closed piston end presses the piston against the *T* member, and, there being a sliding fit between the piston surface and the inner surface of the cylinder, all the air entering the manifold must come through the carbureter intake. If,

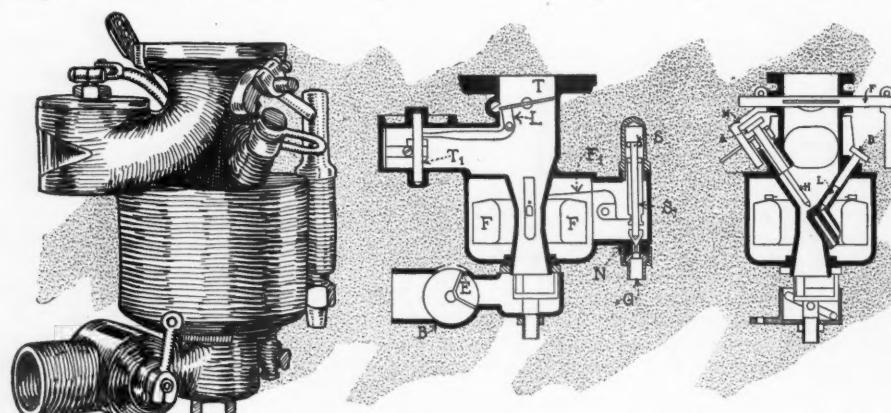


FIG. 1—THREE VIEWS OF THE GALLAGHER WHICH IS CONTROLLED BY THE DRIVER OF THE CAR

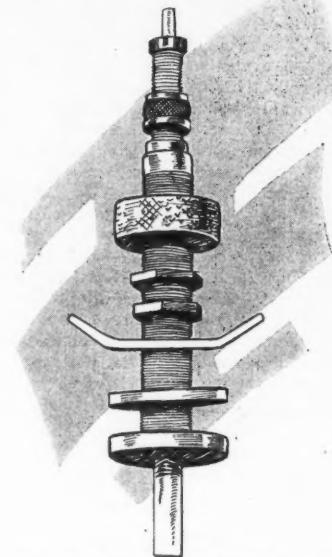


FIG. 3—TIRE DEFLATION ALARM

however, the head of the piston rod which protrudes through the free end of the cylinder is pulled by a cable which is part of the device, the piston is withdrawn from the proximity of the *T* member and the perforations in it are exposed to the external air on account of the slot or passage cut into the cylinder about its middle. Consequently, the motor suction draws air through the Doxameter, and the mixture is thinned to the proper degree. In order to allow only the required amount of air to pass into the intake manifold, a check valve is installed in the passage where the cylinder opens into the *T* connection, and this valve is so constructed as to have only a certain capacity at any given motor speed. The Doxameter is connected to a lever or pedal in reach of the driver, and, if desired, may be operated conjointly with the carbureter throttle, although separate control is preferable. According to the maker the Doxameter feeds only the

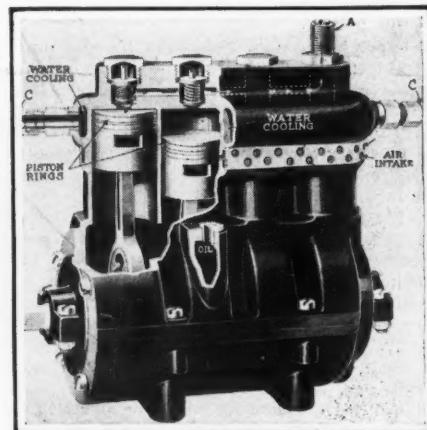


FIG. 4—STEWART FOUR-CYLINDER WATER-COOLED AIR PUMP

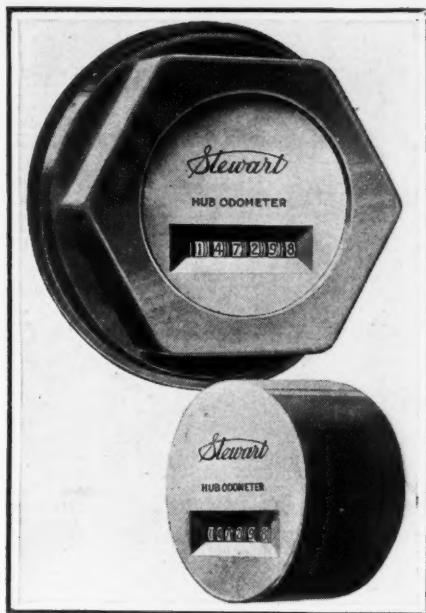


FIG. 5—NEW STEWART HUBODOMETER

proper amount of air at a given motor speed, and does this automatically.

Stewart Tire Pumps

Stewart so well known as a speedometer is now to be placed on a line of two and four-cylinder air pumps, by the Stewart-Warner Speedometer Corp., Chicago. The pumps are marketed in both air and water-cooled type, the four-cylinder model of the latter being illustrated in Fig. 4.

It is built like the motor of a car and has metal pistons and fitted rings and a crankshaft, operating on eccentrics. The cylinders and upper half of the crankcase are cast as a unit and the lower portion which supports the crankshaft and acts as a reservoir for oil to supply splash lubrication, is another unit. A feature of this air pump is the oil separator, which is installed in the air line to prevent any oil making its way to the tires.

As shown in Fig. 4 the air intake is valveless, the air being admitted through apertures in the cylinder walls just above the pistons when they are at bottom dead center. The air intake is screened so as to exclude dirt. The air first passes through the screened portion and is then forced by the piston through the valve in the cylinder head, then past that valve as the arrows in the illustration show and out through the port A to the separator and thence to the tire or gasoline tank as the case may be. The unions C are to be con-

nected to the water system of the motor.

Stewart pumps may be installed on any car and driven either by chain or gears, or by hand if desired. For this purpose a crank handle is furnished. The four-cylinder model shown is listed at \$25 complete with separator, 10 feet of hose and a gauge. The four-cylinder water-cooled model is 7½ inches long, 8 inches high and 4 inches wide, and has a bore and stroke of 1⅓ by 1⅓ inches.

Tire Deflation Alarm

Abbott E. Kay, 2133 Park avenue, Chicago, has brought out a device which acts as a valve stem and a tire deflation alarm, telling the driver of car, by ringing a bell, lighting a lamp or stopping the car, when a tire is about to be deflated. The device does all this by the use of electricity supplied either by a battery or dynamo. Appearing in the form of a valve stem, as shown in Fig. 3, this alarm tells beforehand when a tire is to be deflated or even partially so. In size it is the same as that of the ordinary form of valve stem, and does not occupy any

In the floor of the upper compartment are four holes, which are normally closed by the ends on the plungers. Above the plungers is a coil which acts as an electromagnet and when a current is sent through the coil, the rod and the plungers, rigidly fastened to it, are quickly drawn up. A touch of the push button on the steering wheel will make the plungers jump off their seats and the sand carried in the boxes will spread before each rear wheel. The instant the current is broken again, by taking the pressure off the button, the holes are closed. Thus the slogan, "Will Sand Well."

It should be noted that provision for carrying tools and other articles is made in the lower half of the box, which is accessible by the door at the end. The sand for use in these boxes is of very uniform size and is kiln-dried. Enough is carried in a filling to last practically a full season, the actual time continuously running being 65 minutes. It is put up in 25-pound sacks and is for sale at garages.

New Stewart Hubodometer

The Stewart-Warner Corp., Chicago, has brought out a hubodometer which may be fitted to almost any hub, or if not a special hub cap matching the others of the car will be made with the hubodometer incorporated with it. The device as fitted in the hub cap of an electric vehicle is shown in the upper illustration in Fig. 5, and the hubodometer not installed is shown in the lower illustration.

The drive is by steel pinions with worm and spiral gears, so that the drive is positive. No springs, pawls or ratchets are used, and the maker states there is no way of the device failing to operate. A 100,000-mile season register is provided, the numbers being in black on a white background, with the tenth-mile readings in red. The lower illustration in Fig. 5 shows the model H, which sells for \$15.

Resilio Springs for Fords

The Franco Mfg. Co., Chicago, has brought out springs for Ford cars, shown in Figs. 7 and 8, which are designed to make Fords ride easier, the result being accomplished by the introduction of scrolls, one at each end as shown. The springs supplied with the Ford car are removed for the installation of Resilio springs. It is stated by the maker that when in use they check both the bound and rebound and thus add much to the pleasure of riding. A set is listed at \$25.

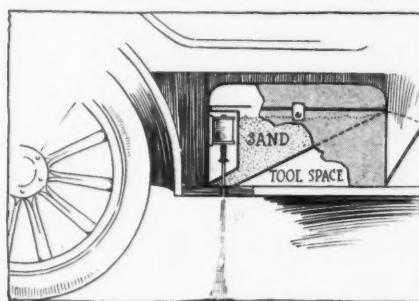


FIG. 6—EMERGENCY SAND CARRIER

more room or add complications. A plunger extends down into the tire and upon the approaching deflation this plunger will move upward and close an electrical circuit, thus ringing a bell or lighting a light as desired. By another method it is made to stop the car, and according to the inventor, this has been done in a number of tests performed recently.

Carries Sand for Emergencies

In Fig. 6 is shown a new device put out by the Auto Sand Grip Co., 690 Woodward avenue, Detroit, Mich., which, when attached to any car, should add greatly to the safety of city driving. On each running board is placed a metal box, about the size and shape of a regulation tool box. Running diagonally across the interior of it is a tight-fitting partition.

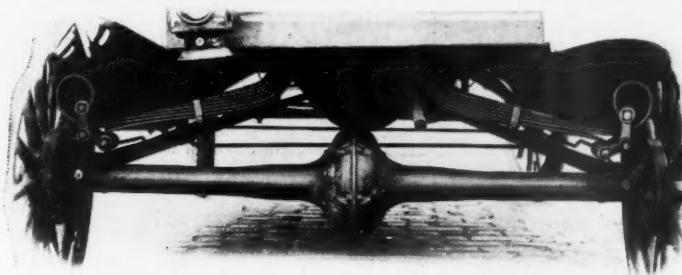


FIG. 7—RESILIO SPRING ON REAR OF A FORD

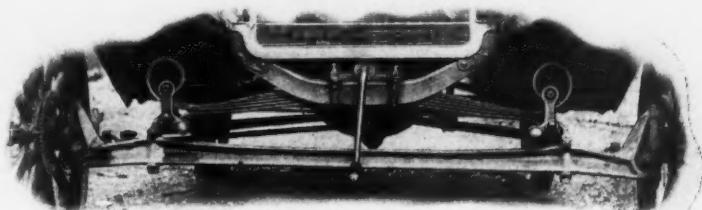


FIG. 8—FORD EQUIPPED WITH RESILIO SPRING IN FRONT



Brief Business Announcements



Recent Agencies Appointed by Motor Car Manufacturers

PASSENGER CARS

Town	Agent	Make	Town	Agent	Make
Boston, Mass.	D. C. Tiffany Co.	Ohio	Middletown, Conn.	F. L. Calkins & Co.	Chalmers
Cleveland, O.	S. F. Slansky	Jackson	Milwaukee, Wis.	Edgar F. Sanger Co.	Abbott
Columbus, O.	Gaither Automobile Co.	American	Milwaukee, Wis.	Jesse A. Smith Auto Co.	Marion
Columbus, O.	E. J. Thornton	Winton	Mt. Vernon, O.	Auto Inn	Ford
Columbus, O.	Litner Garage & Mach. Co.	Jackson	Newark, O.	Fred W. Simpson	Overland
Columbus, O.	Central Auto Vehicle Co.	Paige-Detroit	Oklahoma City, Okla.	Willard H. Say	Hupmobile
Columbus, O.	C. E. Thomas Co.	Mitchell	Onawa, Ia.	Monona Auto Co.	Buick
Cresline, O.	Cresline Garage	Overland	Peoria, Ill.	Wheeler & Wood	Norwalk
Des Moines, Ia.	Taylor Garage Co.	Norwalk	Springfield, Mass.	C. H. Cheeseboro	Moon
Des Moines, Ia.	Partin Palmer-Iowa Co.	Partin Palmer	Tiffin, O.	H. J. Cochrel	Overland
Des Moines, Ia.	Payne Motor Co.	Lozier	Washington, D. C.	Probey-Haynes Motor Car Co.	Haynes
Des Moines, Ia.	Payne Motor Co.	Paige	Wethersfield, Conn.	J. N. McDonald Co.	Velle
Des Moines, Ia.	Holsman Sales Co.	King	Winchester, Ill.	T. C. Hill	Moon
Fremont, O.	East Side Implement Co.	Studebaker	Worcester, Mass.	Peter Wilbur	Pullman
Greenville, O.	E. R. Swinger	Overland	York, Pa.	T. S. Pfeiffer	Franklin
Hartford, Conn.	George D. Knox	Hudson	Minneapolis, Minn.	A. F. Chase & Co.	Empire
Hartford, Conn.	George D. Knox	Broc	Minneapolis, Minn.	A. F. Chase & Co.	Marion
Hartford, Conn.	George D. Knox	Peerless			

COMMERCIAL CARS

Atlanta, Ga.	Paige-Detroit Auto Co.	Commerce	Nashville, Tenn.	Hersig & Black	Commerce
Baltimore, Md.	Square Deal Auto Co.	Commerce	Omaha, Neb.	Johnson-Danford Auto Co.	Commerce
Boston, Mass.	M. B. M. Motor Co.	Wagenhals	Oshkosh, Wis.	Hupmobile & Paige Auto Co.	Commerce
Chicago, Ill.	Commerce Truck Co.	Commerce	Pittsburgh, Pa.	The Klinger Auto Co.	Commerce
Dallas, Tex.	Texas Wagon & Auto Co.	Commerce	Pittsburgh, Pa.	Hamal & Noble	Koehler
Ft. Wayne, Ind.	Electric Supply & Auto Co.	Commerce	Pocono Pines, Pa.	A. E. Miller	Koehler
Joliet, Ill.	R. B. Rhoades	Commerce	Racine, Wis.	W. R. Taylor Motor Co.	Commerce
Little Rock, Ark.	Paige-Detroit Auto Co.	Commerce	Waco, Tex.	Cartercar Sales Co.	Commerce
McKees Rocks, Pa.	Hamal & Noble	Koehler	Youngstown, O.	W. L. Kreps	Koehler
Minneapolis, Minn.	Frederick E. Murphy Auto Co.	Commerce			

WASHINGTON, D. C.—R. C. Creyke, who had the Case agency at 1801 14th street, N. W., has retired from business.

Tucson, Ariz.—R. F. Fishburn, local agent for the Velle, has opened a new garage at this place.

Washington, D. C.—The Waverly Sales Co., which handled the Waverly electric at 1337 Fourteenth street, N. W., has discontinued business.

Milwaukee, Wis.—James A. Wright, of New York, a leading designer of motor car bodies, has joined the staff of A. J. Monday, Milwaukee, one of the largest painting, trimming and body-building concerns in the state.

New York—W. E. Wardlaw, who for some time has been manager of the New York branch of the Schoen-Jackson Co., manufacturers of the Feps carburetor, has tendered his resignation which took effect September 1. About October 1 he will be associated with a new carburetor company.

St. Louis, Mo.—The Kisselkar officially entered St. Louis during the past week, when L. E. Newell, formerly of the Stutz agency in this city, was selected as the Kissel agent. He will do business at 5802 Delmar boulevard.

Milwaukee, Wis.—A new motor car accessory and supply store is about to be opened in Milwaukee by the Billings brothers, Henry and Earl, who have taken a long-term lease on the store at 181 Fourth street, near Grand avenue and are putting in a large stock of goods.

Cleveland, O.—The Cleveland branch of the Oakland Motor Car Co. recently entertained twenty-five Oakland agents from out of town. One hundred cars were disposed of to the agents. Fred Wood, Cleveland's Oakland representative, has fully recovered from a recent operation and is again at his desk.

Milwaukee, Wis.—The Milwaukee Auto Specialty Co., manufacturer of accessories and supplies, has opened its large new public garage at the corner of Chestnut and Seventh streets, adjoining its factory. Walter R. Fleischer is manager of the garage

business. A complete repair shop is maintained.

Phoenix, Ariz.—Ground has been broken for a new brick garage to be erected for W. A. Horrell, local agent for Saurer and Mack trucks and the Cadillac line.

Flint, Mich.—The Imperial Wheel Co. is at work on two large sheds, one being an addition to the boiler room, 30x48 feet and the other being 70x50 feet. Both sheds are of concrete.

Cleveland, O.—The Cleveland branch of the Studebaker Corp. of America, has been ordered discontinued. In the future the Cleveland Studebaker representation will rest solely with the Studebaker retailers, the A. R. Davis Motor Car Co.

Sparta, Mich.—Sparta will soon have an up-to-date garage. A. J. Starn and J. B. Symes, both of Sparta, have purchased the property on North Union street just north of the Sparta State bank, and will commence the erection of a building at once.

Milwaukee, Wis.—The Standard Harness Co., 465 Milwaukee street, Milwaukee, Wis., which several years ago engaged in the tire and supply business to compensate for the waning harness market, has changed its name to Standard-Racine Rubber Co. The firm is distributor for the Racine Rubber Co., Racine, Wis., formerly the Kelly-Racine Rubber Co. John Jiracheck and John C. Zeman are the principal owners of the Standard company.

Plano, Ill.—Sheriff Charles Henderson, of Yorkville, seized fifteen motor cars at the establishment of Dewey & Co., of Plano, on an attachment issued by the Pennsylvania Sales Corp., of Pittsburgh, which has a claim for \$11,993.08 against the Michigan Buggy Co., of Kalamazoo, Mich. The plaintiff claims that the money is due for parts of machines furnished the defendant, manufacturers of the Michigan. Dewey & Co. is distributor for Illinois and Iowa. The hearing is set for the fourth Monday in October.

Indianapolis, Ind.—H. H. Roose, central Indiana distributor for the Maxwell, formally opened a sales branch at 401-405 North Capitol avenue, Indianapolis, August 18, when he was host to a number of Indiana Maxwell

dealers, entertaining them at lunch at the Denison Hotel. H. W. Martz and H. S. Bradley have charge of the Indianapolis branch.

Uhrichsville, O.—Fire destroyed the Barr Bros. garage at Uhrichsville recently causing a loss of about \$20,000. About forty cars were consumed by the fire.

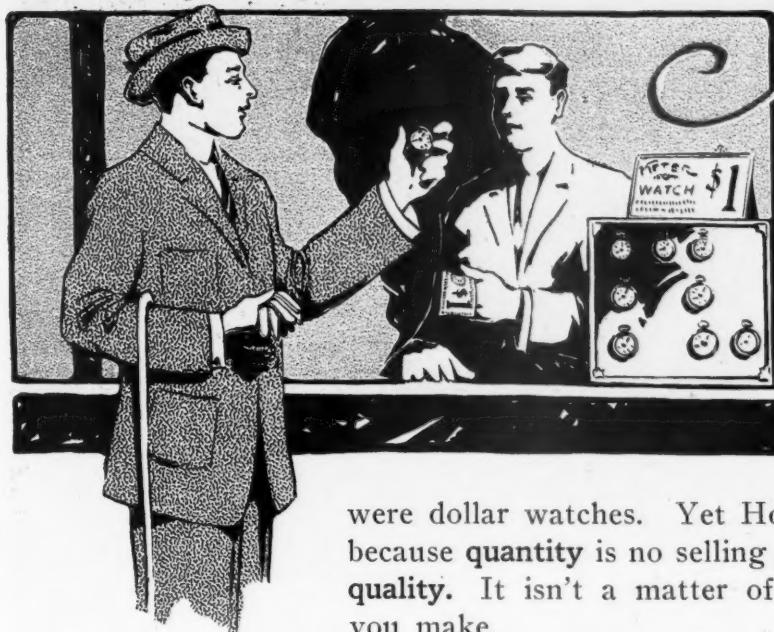
Akron, O.—The plant of the Loewenthal Rubber Co. of Akron, was totally destroyed by fire recently, causing a loss of more than \$100,000.

Louisville, Ky.—The Roy E. Warner Co., local distributors of the Firestone tires, has purchased the Rogers property at the northwest corner of Third avenue and Breckinridge streets, where the concern will erect a 3-story supply house, costing \$40,000.

Washington, D. C.—Miller Brothers, Ford agents, have leased the warehouse at 61-81 Pierce street, N. E., formerly occupied by the Studebaker Corp., and will use it as a service department. It is the largest place of the kind in Washington.

Kenosha, Wis.—Milton A. Kent, owner of the first garage in Kenosha, Wis., now one of the largest in Wisconsin, has disposed of his business to Charles E. Turnock, of Kenosha. The garage represents the Kenosha-made Rambler car. Mr. Kent will devote much of his time until January 1 in pushing the good roads movement in Kenosha county, being chairman of the road committee of the Kenosha Automobile Club, which is directly responsible for the appropriation of approximately \$100,000 for permanent improvement of highways in Kenosha county in 1913.

Cleveland, O.—The recent incorporation of the Ohio Buick Co. marks the passing of the Cleveland factory branch of the Buick Motor Car Co., of Flint, Mich., conducted under the same name at 1615 Euclid avenue. The new corporation will fill the same field as has the branch, handling local retail sales and acting as distributors for Buicks in northern and central Ohio. G. G. G. Peckham, is president and general manager of the new firm. For 10 years he was president of the Peckham Motor Car Co., of Dayton, distributors of Buick and Peerless cars.



A Dollar Watch may be a Good Investment

were dollar watches. Yet Howard and Elgin are still in business, because **quantity** is no selling argument to a man in the market for **quality**. It isn't a matter of **how many** you make but **how well** you make.

You are not carrying a dollar watch because you know that **quality** spells **service**. Now, how about that carburetor of yours? Its importance is three-fold greater than that of a time-piece. It is a clearing house for hundreds of dollars' worth of fuel in a year. If it is dishonest it can cheat you, in wasted fuel, out of its cost many times over. It can cheat you out of **power**—the pride of every car owner. Did you ever stop to consider that perhaps there might be such a thing as a "dollar watch" carburetor?

Our boast is not that we make more carburetors than anyone else. That would be as meaningless as the **quantity** dollar watch argument. What we do boast, however, is that more high-price quality cars carry

STROMBERG CARBURETORS

"The Accepted Standard"

than all other carburetors combined, and that Stromberg carburetors cost more than any other carburetor on the market. They cost **you** more because they cost **us** more, and we are proud of the distinction. If you are not carrying a dollar watch, be consistent by seeing to it that **your** car doesn't carry a "dollar watch" carburetor.

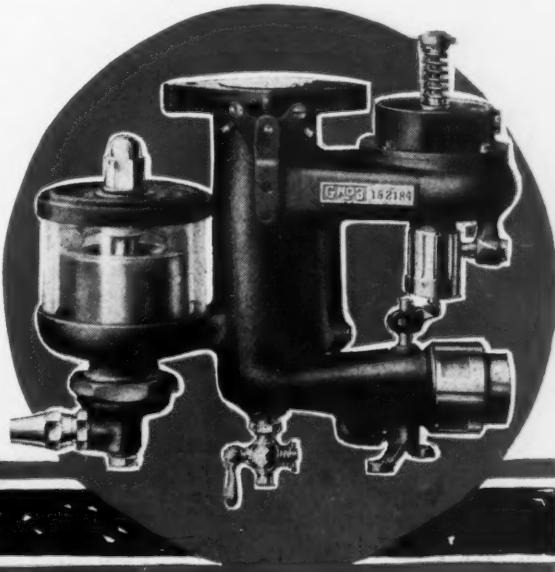
Stromberg Motor Devices Co.
54 East 25th Street, Chicago, Ill.

Branches: NEW YORK
INDIANAPOLIS

BOSTON
MINNEAPOLIS

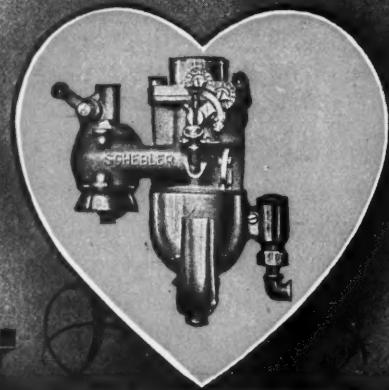
DETROIT

PACIFIC COAST DISTRIBUTORS: Chanslor & Lyon Co., Los Angeles, Portland, Fresno, Spokane, San Francisco, Seattle. Canadian Distributors: Russell Motor Car Co., Toronto, Montreal, Hamilton, Winnipeg, Calgary, Vancouver.



SCHEBLER

*The Aristocrat
of Carburetors*



"The Heart of the Automobile"

WHEELER & SCHEBLER

"Pioneers in Perfection" of Carburetion

MANUFACTURERS
INDIANAPOLIS U.S.A.

THE SCHEBLER IS THE ACKNOWLEDGED
STANDARD CARBURETOR OF THE WORLD

Branches

NEW YORK
BOSTON
PHILADELPHIA
ATLANTA
MINNEAPOLIS
KANSAS CITY
CHICAGO

DETROIT
DENVER
SAN FRANCISCO
LOS ANGELES
SEATTLE
MONTREAL CAN.
SIDNEY AUSTRALIA

*Service Department
Distributors*

Every city and town in
the United States and
Canada - Europe and
Australia

“Standard”

THERE is no difference of opinion as to the “STANDARD” automobile warning signal.

ASK ANY ONE at all familiar with motor cars and accessories and there will be but one answer: The Klaxon.

THE KLAXON has been adopted by the A. E. C., Alco, Armleder, Autocar, H. H. Babcock, Benz, Borland Electric, Broc Electric, Buffalo Electric Roadster, Century Electric, Charon Chicago Electric, Columbia, Croxton, Davis, F. I. A. T., Havers “Six,” King, Kissel, Knickerbocker, Knox, Lancia, Locomobile Lozier, Marmon, Matheson, Maxwell “Six,” Mercedes, Metallurgique, Multiplex, National, Nyberg, Oakland, Oldsmobile, Packard, Peerless, Peugeot, Pierce-Arrow, Pope-Hartford “Six” Pratt, Rambler, S. & M. “Six,” Schneider, S. G. V., Simplex, Stafford, Staver, Stearns, Sternberg, Stevens-Duryea, Standard-Dayton, Touraine, Walker Electric, Ward, White, Winton.

THIS LIST is the unanswerable indication of the Klaxon’s standing.

THE car manufacturer who claims the use of “standardized” accessories must of necessity provide the Klaxon—otherwise his claims are meaningless.



Lowell-McConnell Mfg Company Newark, N.J., U.S.A.

KLAXON

“The Public Safety Signal”



Type Composition of this advertisement done in the Klaxon Factory with “Klaxon” type especially designed by F. W. Goudy

World's Stock Champion.
Fastest Stock Mile

National

World's Fastest 500
Miles in Competition

One question in a million brains

Everywhere men are asking the same question
YOU are asking yourself: "What is to be the
future of the motor car business?"

Stronger and stronger glares the spot light of
truth on the situation. More and more the public
sees and realizes the truth. The answer to the
question is found today in the PUBLIC CONFIDENCE. Opinions may differ in details, but
the fact remains that the manufacturer who has
proven his honesty, sincerity, and his here-to-
stayness is the one who is being elevated to the
highest level of public confidence today.

The methods of manufacturers and their selling
policies decide their measure of true worth—
or lack of it.

The future of the motor car business is GOOD.
Good for what?

Good for the GOOD builder and GOOD dealer.

The public wants its money's worth; it wants to
buy where it has confidence in the car builder,
the car's reputation and the prestige and rating
of the manufacturer. A car can rise no higher

than its source, its factory. A dealer can rise no
higher than his car.

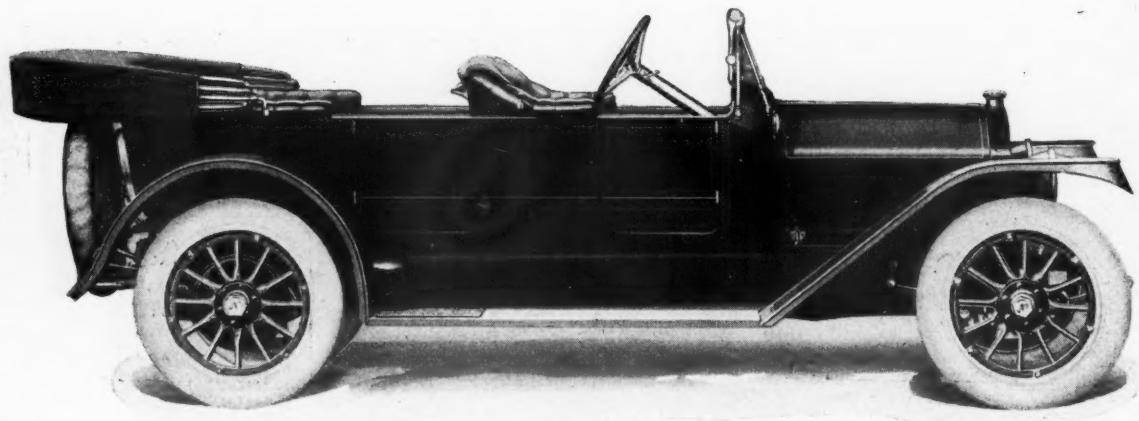
Catalog specifications, the paint on the hood, and
salesman's speeches are futile if the car is lacking
or the builders are not absolutely responsible and
firm.

It is inevitable that the reputable builder with
square methods of dealing with customers and
who produces the greatest value in his cars, is
the one who will have the confidence of the
public. The NATIONAL wins business and
customers for you.

We repeat: For a car of quality, power in abundance,
speed in emergencies, dependability, reliable
and always efficient service, perfect control,
convenience and comfort, there is no better car
built than the NATIONAL.

This is a matter of record, in tests and actual
demonstrations of all kinds. This is guaranteed
by a thirteen-year-old company with unimpeachable
rating and good will. The NATIONAL
company is stable; it is here to stay because it is
right in its methods of giving the public the one
service that counts—QUALITY.

The answer found in the *National* car



Improved series V-3—five models, \$2750 to \$3400—immediate delivery

National Motor Vehicle Co.

Indianapolis, Ind.



*A Continued
Story—
Chap. 3*

No. 4
In our next

Well, what the—
Let's think!

I've cranked that confounded, fool car for the last half hour and she won't start.

What have I forgotten?

To prime the engine?

Tickle the carbureter?

Open petcocks?

Shut off the air?

Spark switch turned on?

Gas turned on?

Gasoline all gone?

Gee! I've got to get her going some way. I'll try her some more—Lord! how my back aches.

Write us for full information.



Storage Battery

WILLARD STORAGE BATTERY CO., Cleveland, Ohio

New York Branch: 136 W. 52nd St.

Detroit Branch: 1191 Woodward Ave.

Indianapolis Branch: 438 and 439 Indiana Pythian Bldg.

Chicago Branch: 2241 Michigan Ave.

San Francisco Branch: 243 Monadnock Bldg.

Depots in all Principal Cities in the United States and Canada.



The Car You Can Sell Against Both High and Low-Priced Sixes

In the Havers 6-60, at \$2485, with the most complete equipment ever put on any car, we offer you a car that occupies its own field.

And that field, you recognize, virtually removes the car from both high and low-priced competition.

On the other hand, the Havers is so high in quality, and makes such a complete offering of all the six-cylinder advantages, that it is bound to attract buyers from both classes.

The man who has paid more for his six has not had—and will not get—more than the Havers 6-60 brings him; a fact that will impress itself upon him when he sees the 6-60.

The man who has had one experience with the average six of low price now realizes that his car fell short in many respects.

So there are two great bodies of men who are potential Havers buyers.

Havers dealers took all of the 1913 product we could build. The close of the selling season found the factory floors and the dealers' floors clean of cars.

The 1914 production is now going into dealers' hands. New contracts are being closed. All our old dealers are holding the line; new ones are coming in, for we shall build more cars for 1914.

Every dealer who has investigated the Havers record in the past year, and the new car, sees for it sales even more readily closed.

Full-powered, high-grade, built of standard units of known quality and highest repute, more completely equipped than any other car on the market—the Havers 6-60 offers all that any six can offer, and more than most.

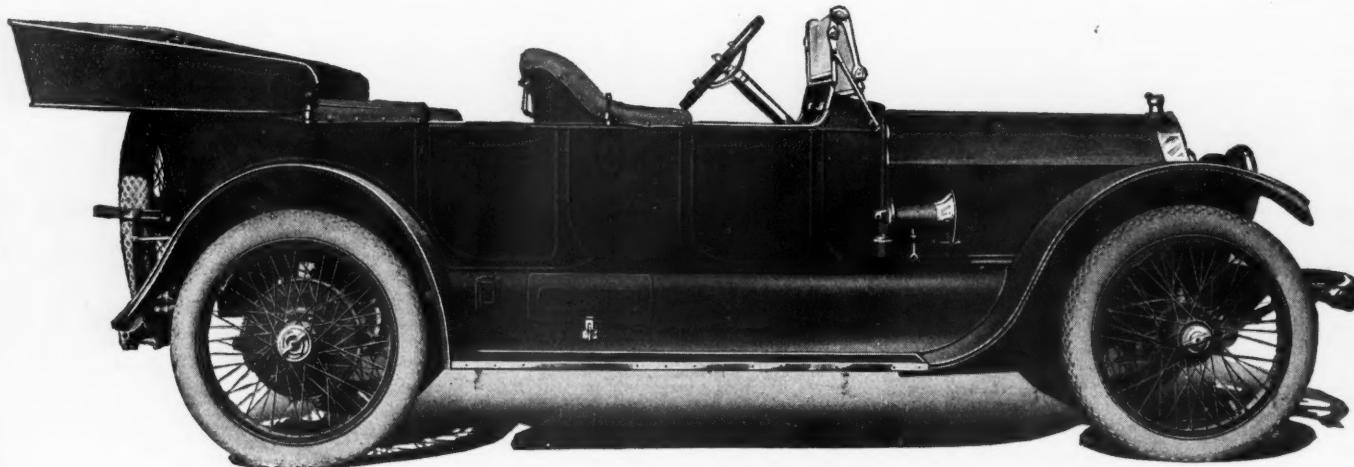
If you have or can make a place in your business for such a car our advice is to waste no time in getting in touch with us.

1914 Features

- Seven passenger body
- Seat covers
- Front bumper
- Rear double tire irons
- Klaxet horn
- Power tire inflator
- Rain vision windshield, built as part of body
- Gasoline gauge
- Air pressure gauge
- Eight-day clock
- Ammeter
- Volt meter
- Large dial speedometer
- Two cowl-board lights
- Tonneau light
- Oil can holders
- Electric starter and lights
- 10 gallon reserve gasoline tank at rear
- Foot scrapers on running board

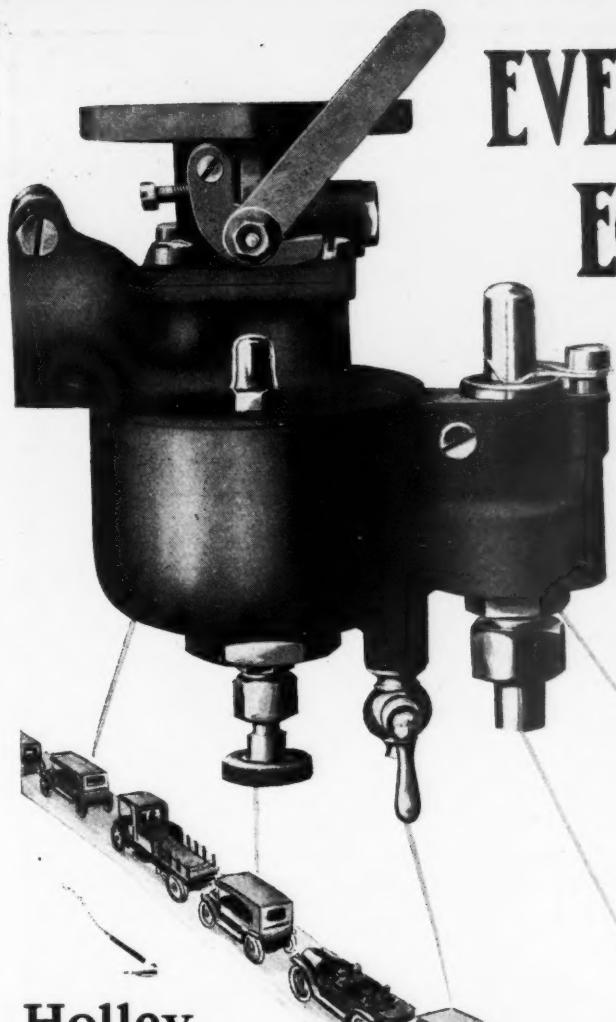
Havers Motor Car Company,

Port Huron, Mich.



Havers 6-60—\$2485, with the most complete equipment ever put on a car as "regular"
Havers 6-44—\$1985, with complete equipment

When Writing to Advertisers, Please Mention Motor Age.



EVERY 2ND 1913 CAR EQUIPPED WITH A "NO MOVING PARTS" **HOLLEY**

The entire elimination of springs, delicate valves, balls, cams and other sensitive devices which are hard to adjust and which get out of order easily have made the new no-moving-parts Holley such a favorite that over half of the gasoline cars manufactured in the United States during 1913 are equipped with this carburetor.

Over 250,000 already sold and in use.

1000 made and shipped daily.

Holley Brothers Company makes more gasoline automobile carburetors than all other carburetor manufacturers combined.

1914 demonstration outfits are now ready

Let us have your specifications early.

Holley Brothers Company

131-141 Rowena St.
Detroit, Michigan

AUTOMOBILE SUPPLY COMPANY

1335 Michigan Boulevard.....Chicago, Illinois
OMAHA RUBBER COMPANY.....Omaha, Nebraska
FOREIGN BRANCH: Holley Bros. Co., Coventry, England

Holley Carburetors are carried in stock at the following addresses:

CHAS. E. MILLER
Home Office: 97-103 Reade Street and 121 Chambers Street, New York

BRANCHES:

New York City.....	924 Eighth Ave.	824 Main St.
Between 54th and 55th Sts.		Albany, N. Y.....
New York City.....	2782 Broadway	135 Central Ave.
Between 107th and 108th Sts.		Boston, Mass.....
Springfield, Mass.	Bridge & Dwight Sts.	202-204 Columbus Ave.
Hartford, Conn.....	274 Trumbull St.	Detroit, Mich.....
Atlanta, Ga.....	66 Edgewood Ave.	227-229 Jefferson Ave.
Brooklyn, N. Y.....	1421 Bedford Ave.	Cleveland, Ohio.....
		1829 Euclid Ave.
		Philadelphia, Pa.....
		318 North Broad St.
		New Orleans, La.....
		601-608 Baronne St.
		Newark, N. J.....
		274 Halsey St.

HOLLEY CARBURETOR



*Makes Every Gasoline
Motor Worth More*

Polarine
FRICTION REDUCING MOTOR OIL

Polarine starts to lubricate at the first turn of the motor—even in winter, after standing for hours at a temperature of zero. It maintains the correct lubricating body at any motor speed or heat, on the hottest summer day.

It penetrates to every part and gives it full protection. It keeps friction at the no-wear point and thus obviates many costly repairs.

And it serves in any type of motor—motor cars, motor boats, motor trucks.

Don't spoil a good motor with poor oil. And don't judge motor oil by appearance. The poorest oils may look as good as the best.

Polarine is made by the World's Oil Specialists after fifty years' experience with every kind of friction problem. Present day possibilities do not permit of the making of any better oil. All our vast facilities and resources are concentrated on Polarine.

Standard Oil Company
(AN INDIANA CORPORATION)

Makers of Special Lubricating Oils for Leading
Engineering and Industrial Works of the World

(110)



This is the 1914 Oldsmobile that so many dealers have been clamoring for
the Greatest Six-Cylinder Car Ever Produced

OUR entire sales organization, engineering department and factory managers not only endorse the statement that this is the greatest six-cylinder car ever produced, but insist upon advertising it as such. There is no other expression which so adequately and truthfully describes the new 1914 Oldsmobile Model 54.

We have never before in our sixteen years of automobile manufacturing made so strong a statement. Our policy has ever been, and will continue to be, a truthful adherence to facts, and when we commit ourselves we believe we can prove by demonstration or comparison that we have not underestimated the position occupied by Model 54 among sixes.

From the purchaser's viewpoint this 1914 Oldsmobile contains every feature of refinement, stability, luxury and power that can be found in cars of greater price.

From the dealer's angle it has back of all these features a reputation as solid and as old as the industry itself.

It is fair to state that there is not another six-cylinder car in America any better or wider known than the Oldsmobile.

It is not necessary to introduce the Oldsmobile. Olds

Motor Works was founded in 1880, and after 34 years of successful manufacturing we celebrate anniversaries, not introductions.

You, who are familiar with motor car values, compare the 1914 Oldsmobile with higher priced cars and see for yourself if there is any reason why we should not be classed with the highest priced. Compare with cars of cheaper make and try to find an argument for not adding just a few dollars more in order to secure an Oldsmobile.

Dealers interested in six-cylinder cars have displayed a keener interest in the 1914 Oldsmobile than in any other model ever produced by the Olds Motor Works, and have unanimously pronounced it a supreme achievement among sixes.

The complete equipment on the Model 54 is the finest that money can buy.

*Four or Five-Passenger Phaeton touring body type - - \$2975
 Seven-Passenger Touring Body, \$175 extra. Limousine, \$4300
 Wire Wheels—Oldsmobile Trunks and Extra Tires at Additional Cost*

TO RELIABLE DEALERS WE HAVE AN INTERESTING AND PROFITABLE MESSAGE

1914 DELIVERIES BEGIN AUGUST FIRST

OLDS MOTOR WORKS

Lansing, Michigan

**Few people will buy cars this coming year
'without first seeing the HAYNES
—America's first car—with its year ahead
features, including the Electric Gear Shift**

Handle the Haynes, and auto buyers will hunt you up.

Usual customs and circumstances are being reversed this year among Haynes dealers. They have no problem of "scaring up prospective buyers"—whom they may develop through much talking and demonstrating into buyers, and more often may not.

Prospective automobile buyers are hunting up the Haynes dealer, to see the car they have heard so much about—they are eager to see the Electric Gear Shift and try it for themselves.

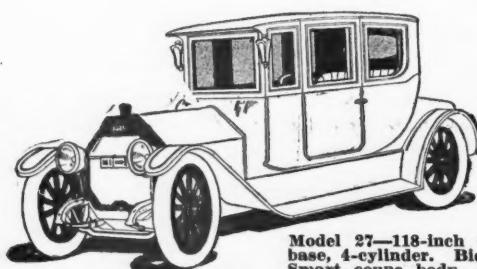
The Electric Gear Shift

draws prospective buyers in crowds to see the

HAYNES

America's First Car

They are as eager to see the Electric Gear Shift and try it for themselves as our dealers are to show them. Everybody has heard about the wonderful Electric Gear Shift. Wonderful is the only name strong enough to fit the device by which the gear lever is entirely superseded—relegated to the tool box—while the shifting of gears is accomplished in the simple, easy way of pressing push buttons, conveniently located on the steering wheel.



Model 27—118-inch wheel-base, 4-cylinder. Biddle & Smart coupe body. Price, \$2700



Everything that adds comfort, convenience and service is standard equipment in the Haynes

Specifications of The New Haynes

Motor—Bore 4½ in., Stroke 5½ in., L-head Haynes. Cylinders cast in pairs. Model 26, A. L. A. M., 43.35 H. P., Dynamometer, 65 H. P. Model 27, A. L. A. M., 43.35 H. P., Dynamometer 65 H. P. Model 28, A. L. A. M., 29.9 H. P., Dynamometer 48 H. P.

Weight—Model 26, 3800 lbs., Model 27, 4000 lbs., Model 28, 3400 lbs.

Cooling—Centrifugal pump and pressed steel fan.

Wheel Base—Model 26, 130. Model 27, 136. Model 28, 118.

Ignition—American Simms Magneto.

Carburetor—Stromberg.

Lubrication—Splash and gravity feed.

Control—Left hand. Vulcan Electric Gear Shift.

Transmission—Selective Type, three speeds forward, one reverse.

Steering Column—Worm and worm gear type.

Clutch—Haynes contracting steel band.

Rear Axle—Full Floating Timken on Models 26 and 27; McCue, Model 28, Gourney Bearings.

Front Axle—I-beam. O. H. steel heat treated.

Wheels—Artillery type. Funk demountable rims.

Tires—Models 26 and 27, 36x4½. Model 28, 34x4.

Springs—Front Semi-elliptic 39½ x2, rear 48x2.

Brakes—15½ external and 15 internal Models 26 and 27. 12 and 16 internal on Model 28.

Finish—Indiana dark blue body. Pacific Tour gray, optional.

Gasoline Feed—Pressure. Automatic feed.

Upholstery—Buffed leather, deep cushions.

Starting and Lighting—Leece-Neville electrical system.

Cowl-board Equipment—Electric lights, sight oil feed, automatic cut-out for generator, dash light, auxiliary air pressure pump, air gauge and speedometer. Models 26 and 27 have rim wind clock.

Other Standard Equipment—Top, top cover of silk mo-hair, mechanical tire pump, rain vision ventilating wind-shield. **Vulcan Electric Gear Shift**, two large electric headlights, electric side lights, electric tail light, full dash equipment, electric starter, generator, 12 volt, 80 ampere hour storage battery, speedometer, horn, coat and foot rails, tire irons, full tool equipment, one extra demountable rim and Collins curtains. Models 26 and 27 have Truffault-Hartford shock absorbers.

Hand lever shift optional at \$200 reduction

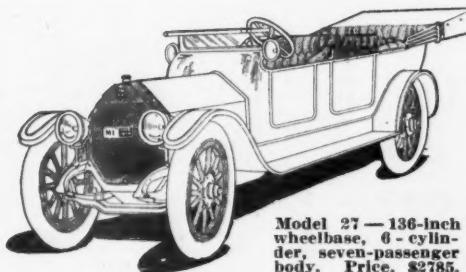
HAYNES

cars literally sell themselves

They draw large numbers of prospects to the salesrooms of our dealers. We are also directing to our dealers dozens of people who have taken the trouble to write us for our nearest dealer's name.

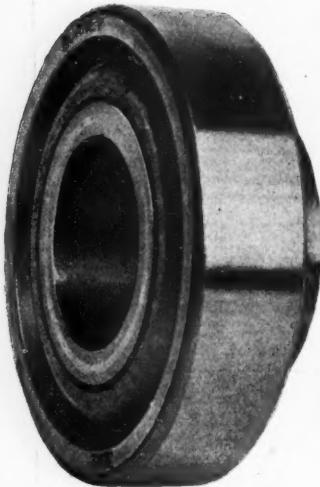
Once a prospect starts investigating the Haynes, he cannot be satisfied with any other car. The pride of owning the Haynes, America's First Car, its reputation for power, speed and reliability, coupled with everything in the way of up-to-date equipment—including electric starting, lighting and the Vulcan Electric Gear Shift—makes the Haynes the most sought-after car on the market.

The Haynes Automobile Co.
2 Main Street, Kokomo, Indiana



Model 27 — 136-inch wheelbase, 6-cylinder, seven-passenger body. Price, \$2785.





THIS BEARING, THE GURNEY RADIOTHRUST BEARING, is especially applicable in a number of places in a Motor Car. And in these places it has distinct advantage over any other bearing made.

¶ In Front Wheels—in addition to the simplicity, low friction, and general desirability of the annular ball bearing it has the one thing more desired, abundant capacity to take thrust.

¶ On Rear Axles and in Rear Wheels—In any of the various types in use, it has precisely the same advantages as in the Front Wheels, all the good features of the best annular ball bearing plus Thrust Capacity for any possible exigency.

¶ Next to the Differential—A single bearing serves with equal efficiency and success where ordinarily two bearings are used, a radial and a thrust bearing.

¶ Back of the Bevel Pinion—As next to the Differential you get in One Bearing all the service of two bearings, and at the Price of One.

¶ The Gurney R-T Bearing is the Ball Bearing plus. It gives you all the bearing value you have heretofore gotten, plus certain very desirable features you have always wanted. It gives you Gurney CAPACITY and ENDURANCE, plus Gurney SIMPLICITY and ECONOMY.



Gurney Ball Bearing Company
Jamestown, N. Y.

*Nineteen
Fourteen
Models*

Marathon



Marathon "Winner" Five Passenger Touring.

**35-H. P., 118-inch Wheel Base, Fully Equipped
Electric Starter and Electric Lighting**

\$1325



THIS IS WHY

When this advertisement is read we know the statement will be made that it cannot be done. But we are doing it. Deliveries of the \$1325 Touring Car are being made today in quantities. Marathon cars are being produced in one of the largest and best equipped automobile factories in America on a 100 per cent efficiency basis. This is why.

Champion Series

A 35-horse power, 128 inch wheel base, full floating rear axle, 18 inch corrugated Walnut steering wheel, demountable rims, one extra rim, 30x4 inch tires, best grade of silk mohair top, top boot, one piece adjustable wind shield, speedometer, Turkish upholstering, tire irons, tire straps, electric horn, cowl dash.

Touring car, \$1495. Roadster, \$1470.

DEALERS—There is yet some open territory. To those dealers who can give us the right kind of representation, we have a proposition to offer that will be of real interest. Write, wire, or, better still, come to Indianapolis at once.

Write for Catalogue, M. A.

Herff-Brooks Corporation, Indianapolis, Ind.
GENERAL SALES AGENTS MARATHON AUTOMOBILES

Winner Series

Electric Starter and Electric Lights

Motor—Four cylinders, cast in pairs, 4 1/4 x 4 1/2 in.

Ignition—Dual system: batteries with magneto.

Drive—Shaft drive, straight line to rear axle.

Axles—Front axle "I" beam. Rear full floating.

Steering Gear—Worm and gear type, with four positions to take up wear, 18-in. solid walnut wheel.

Gear Ratio—4 to 1.

Wheels—Artillery type. Demountable rims and one extra rim.

Wheel Base—118 inches.

Tires—34x4 inches.

Clutch—Multiple disc, operating in oil in fly wheel housing.

Transmission—Selective type, three speeds forward and reverse.

Bodies—Five passenger touring. Two passenger roadster.

Equipment—Silk mohair top, top boot, one piece adjustable wind shield, speedometer, Turkish upholstering, Jesco electric starter and electric lights with full lamp equipment, electric horn, demountable rims, one extra rim, tire irons, tire straps, pump, tire repair kit and other usual equipment.

Price, f. o. b. —Touring car, \$1325
Factory Roadster, \$1300

SHELDON

AXLES

and SPRINGS

ARE SALES HELPS

Every manufacturer endeavors to build into his car those selling points which will assist the dealer in his sales.

Every unit of national reputation in a truck helps to sell that truck. The public knows the value of that unit because the manufacturer, who is a specialist in that particular subject, has convinced them of its splendid qualities.

SHELDON AXLES and SPRINGS have a nation-wide reputation. Their

quality has been proved in actual service. Their splendid design and superior mechanical construction is an accepted fact in engineering circles. Only the best scientifically treated materials are used. In fact, so persistently has the public been told—and so well do the engineers know—these qualities that the synonym for axles and springs is "Sheldon."

You *can* utilize this reputation. Why not build it into your trucks? You can thus have it help you sell your car.

SHELDON FOUNDATIONS for every type of service.

Axles

Brake Equipments
Worm Drives

Radius Rods

Jack Shafts
Springs

Transmissions

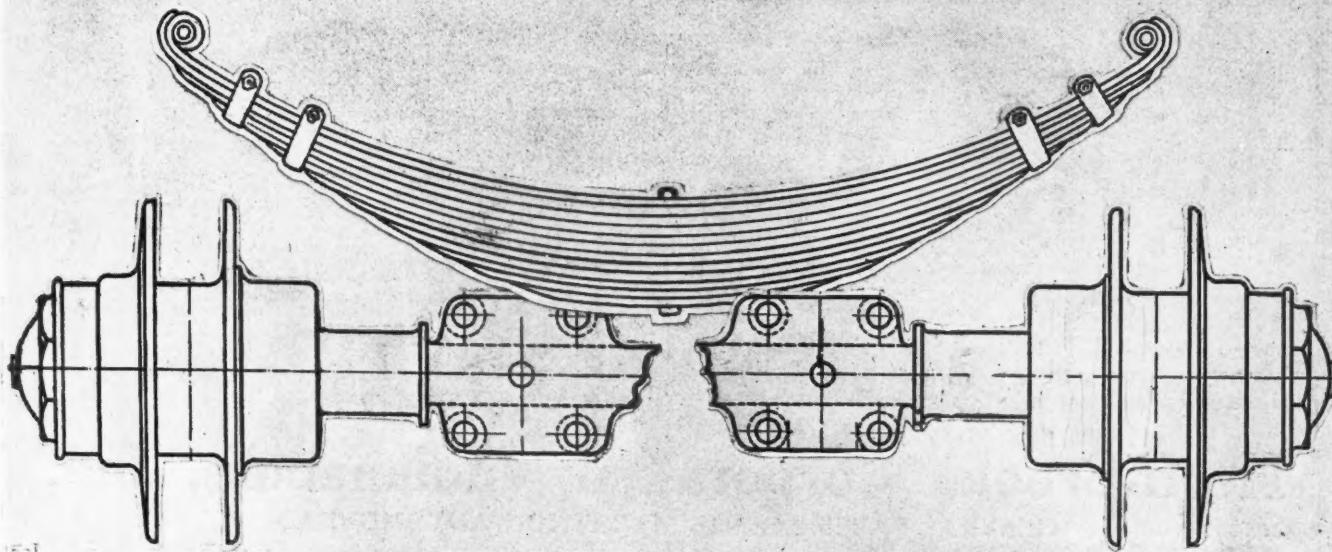
Steel Wheels

SHELDON AXLE COMPANY, Wilkes-Barre, Pa.

Chicago Office:
68 E. 12th St.

San Francisco Office:
444 Market St.

Detroit Office:
1215 Woodward Ave.





\$2175

Fully equipped f. o. b. Detroit

The Master Motor of Them All

What other makers are still striving for we give you in the New Chalmers "Six."

To the best features of the costliest cars we have added these crowning triumphs:

Silence at all speeds; silence that lasts.

Many cars that are quiet at ten miles an hour, kick up a lot of noise at thirty. Watch the speedometer of the New Chalmers "Six";—30—40—50 miles an hour and not a murmur from our big oval cams or enclosed valves.

The Silence of the Chalmers "Six" means more than the mere luxury of quiet. It tells you that your motor is working with the perfection of a watch—without the slightest wear. And this silence continues for years.

Sustained power; even after years of use.

This motor, like the trained athlete, grows better by action. Its Tungsten steel valves are not affected by the cylinder heat. So there's no warping—no leaking—no power wasted. Think of the years of extra service this master motor will give you.

No vibration; comfort and long life.

The smoothness of the "Six" saves wear on the car as well as on the passengers. The interval between the explosions of any "four" makes a gap in the power stream. It produces a vibration that hammers constantly at the life of the car. There's no escape from it. The explosions of the "Six" give an unbroken stream of power. This gives smoothness and economy that no "four" can equal. It adds years to the life of the car.

Extreme flexibility, without intricate gearing.

You'll find you can do nearly everything on "high." It does away with gear shifting almost entirely. With this "Six" any supplementary gear mechanism would be useless. The motor itself gives a suppleness of power unknown even in costlier cars.

A Non-Stallable Motor.

This motor will never go dead in the crowded city traffic. The electric starter won't let it.

Even if the driver should cut off the gas accidentally, the electric starter, always on duty, keeps the motor running—won't let it stop.

This is the greatest feature of safety and convenience put on a car in the last five years.

These features mean far more than the luxury they bring. They mean no wear—no waste of power—no depreciation. A car that lacks them may cost you less to buy—but it will cost you more to keep.

When once you know the years of extra service these features add, you'll wonder how we give them at the price, \$2175.

Go ride in this car—at our dealer's. Let it tell its own story in deeds. It can neither over-rate its virtues nor hide its defects. It must tell the truth—nothing else.

Let us send you literature explaining why the New Chalmers "Six" is the master motor of them all. Write today.

Salient Features of the New Chalmers "Six"

Six-cylinder motor, T-head type $4 \times 5 \frac{1}{2}$ —"40-65 h. p. All moving parts enclosed.

Bosch Magneto.

Electric starter—Entz System, built in Chalmers shops.

Non-stallable motor.

Full electric lights—Our powerful headlights also contain auxiliary lamps of moderate power for city driving.

132-inch wheel base.

Molded oval fenders.

Gasoline tank and tire carrier on rear—clean running boards.

Left drive and center control—enter from either side.

36x4 $\frac{1}{2}$ -inch tires and Continental demountable rims.

Four forward speed transmission.

Underslung rear springs; main leaf of vanadium steel.

Tapered bonnet and stream line, bell backed body.

Chalmers patented doors—unusually wide.

Full equipment—including Chalmers silk mohair top, quick acting storm curtains, Warner speedometer, one extra demountable rim, electric horn, pump, tools, etc.

Models and Prices

Roadster	\$2175
Four Passenger	\$2175
Five Passenger	\$2175
Six Passenger	\$2275
Coupe	\$2850
Limousine	\$3600

(Fully equipped, f. o. b. Detroit)

Chalmers Motor Company Detroit

When Writing to Advertisers, Please Mention Motor Age.

48 "Six" KISSELKAR 48 "Six"

A Spontaneous Success

The warm reception of the new KisselKar 48-“Six,” and the popularity it has attained in only a few weeks, prove beyond doubt that the public is quick and keen in the recognition of automobile values.

Wherever this car has been shown it has created genuine enthusiasm. Its low hung chassis, clean, artistic lines and general refinement of design create an instantly favorable impression, which is decisively confirmed by a study of the specifications and practical test of its riding qualities.

The KisselKar 48-“Six” is **more** than “eye-deep.” While it is good to look upon—every inch an aristocrat from radiator to tail-light—the real measure of its merit lies in the things that have to do with **service** and **comfort**. In these vital factors the KisselKar 48-“Six” challenges comparison with any car regardless of price.

There is no more efficient power plant under the hood of any automobile. The Kissel engine is famous for its power, responsiveness and silent, smooth run-

ning qualities. It is easily accessible, as transmission and clutch are combined in a single unit.

Exceptionally liberal wheelbase, big door openings, springs and shock absorbers, roomy tonneau, deep upholstered seats and de luxe equipment, including Golde patent “one man” top, Warner speedometer and Klaxon horn, afford all the comfort and convenience provided by cars costing hundreds of dollars more than the KisselKar 48-“Six.”

The more you draw comparisons, the more you will be impressed that the new KisselKar 48-“Six” is a car of rare, distinctive and unmatched value.

There are three KisselKar Models: 48-“Six” at \$2350; 60-“Six,” \$3150, and 40-“Four,” \$1850. All fully equipped, electric lighted and started; left hand drive, center control.

Now being shown by our representatives everywhere. See your nearest dealer for demonstration, or write us for Catalog.

KisselKar Service Contract—The KisselKar is sold under a written guarantee of service to owners—a tangible, definite and specific contract that clearly stipulates the scope of KisselKar Service. Ask for a copy.

KisselKar Trucks—1500 lbs. to 6 tons—are used in over 200 distinct lines of business. Write for Truck Catalog.

Every
Inch
a Car



KISSEL MOTOR CAR CO., 135 Kissel Ave., Hartford, Wis.

BOSTON

NEW YORK

CHICAGO

MILWAUKEE

KANSAS CITY

MINNEAPOLIS

ST. PAUL

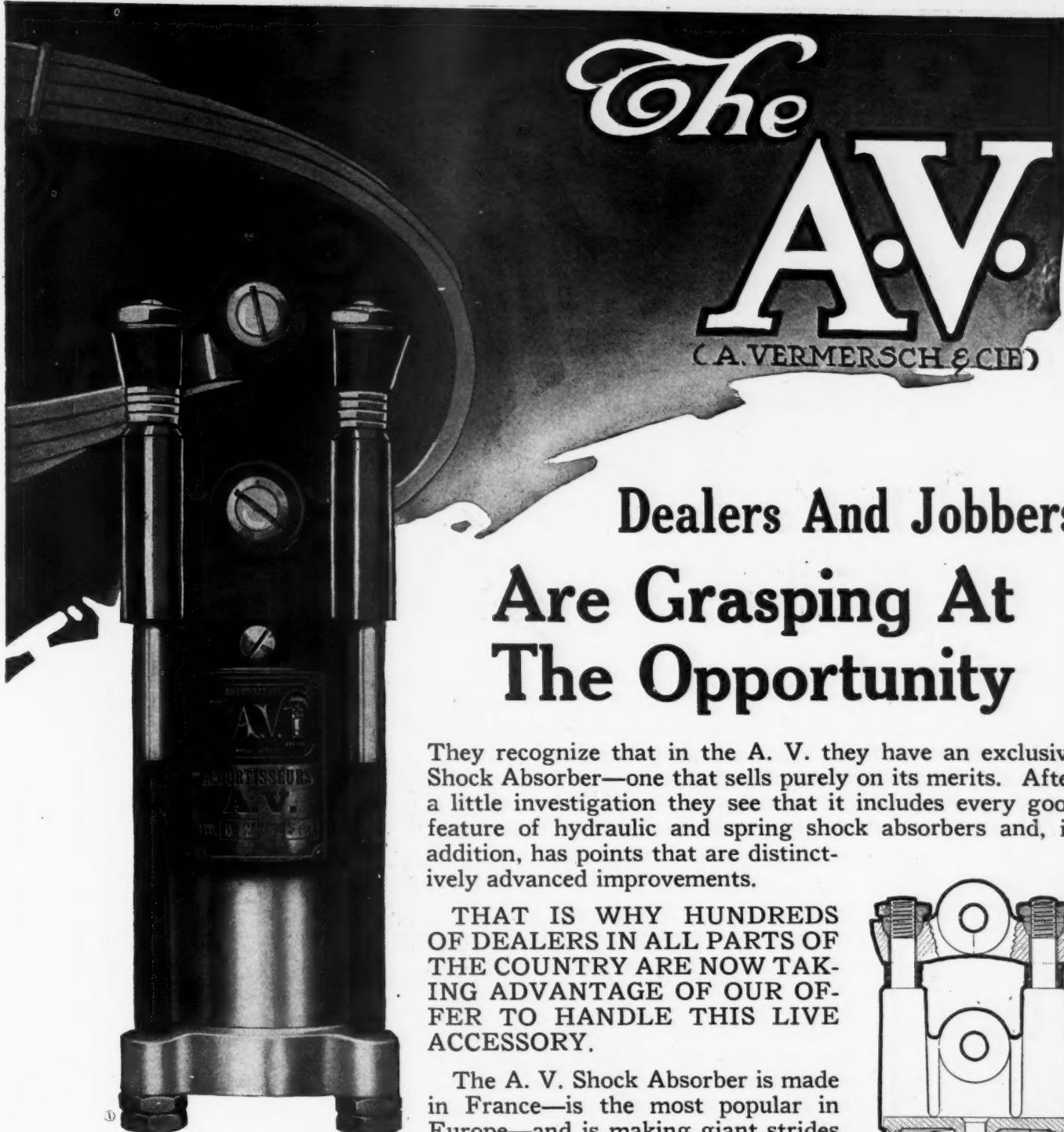
DALLAS

SAN FRANCISCO

LOS ANGELES

OAKLAND

Philadelphia, Detroit, Houston, El Paso, New Orleans, Washington, Baltimore, Nashville, Duluth, Buffalo, Pittsburgh, Hartford, Conn., New Haven, Albany, Troy, Rochester, Providence, Montreal, Quebec, Toronto, Winnipeg, Calgary, and 300 other principal points throughout America



The A.V. (A. VERNERSCH & CIE) Dealers And Jobbers Are Grasping At The Opportunity

They recognize that in the A. V. they have an exclusive Shock Absorber—one that sells purely on its merits. After a little investigation they see that it includes every good feature of hydraulic and spring shock absorbers and, in addition, has points that are distinctively advanced improvements.

THAT IS WHY HUNDREDS OF DEALERS IN ALL PARTS OF THE COUNTRY ARE NOW TAKING ADVANTAGE OF OUR OFFER TO HANDLE THIS LIVE ACCESSORY.

The A. V. Shock Absorber is made in France—is the most popular in Europe—and is making giant strides here in America.

Immediately applied in place of the spring shackle without any special attachments

\$35 Per Pair and Up

Dealers should write today for our proposition

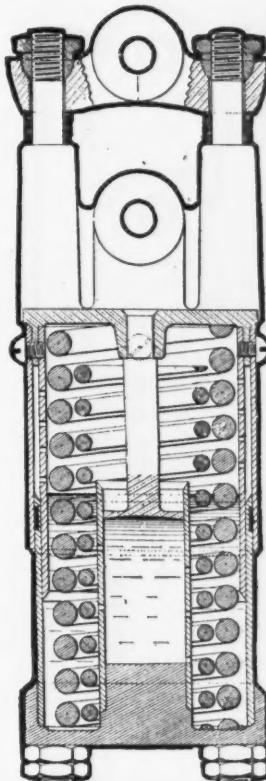
HUDSON EXPORT & IMPORT COMPANY
140 West 42d Street,
NEW YORK CITY

RHINELAND MACHINE WORKS

1254 Michigan Avenue, CHICAGO, ILL.
650 Woodward Avenue, DETROIT, MICH.

JOHN V. WILSON COMPANY

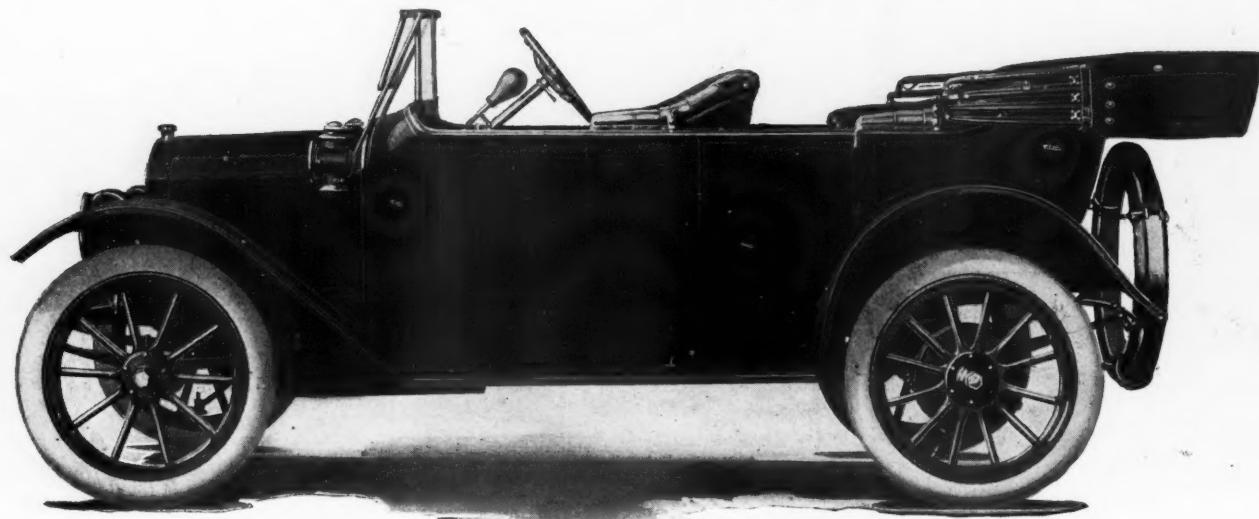
1424 Vine St., PHILADELPHIA, PA.
220 Motor Mart, BOSTON, MASS.



When Writing to Advertisers, Please Mention Motor Age.

A Real Automobile for \$750

1914 Maxwell "25-4"



An Engineering Triumph

The car that makers of "cheap" cars have feared
—the car dealers everywhere have hoped for.

The car you have been waiting for—designed as
you would have designed it; had you the say.

Designed with the cost of maintenance and up-
keep as the first consideration.

Quality made possible by our superior facilities
for analyzing and testing steel and all other mate-
rials that go into it—our own chemical-metallur-
gical laboratories.

Light weight—which means light tire and other
maintenance bills—made possible by the use of the
best materials known to the science, heat treated in
our own ovens.

Price made possible only by the fact that, with
our tremendous manufacturing facilities, we are able

to produce this model in great numbers with every
part interchangeable.

Extremely low price gives us a very small margin
of profit per car, but has created a tremendous de-
mand—and the small profit many times multiplied
suits us better than a large profit per car on a few.

Briefly—Four cylinder, 25 horse power motor.
Cast "en bloc" with detachable heads. Water
cooled—thermo siphon system. Magneto, 3 speed,
selective transmission; cone clutch; centre control,
left side drive; 103 inch wheel base; full 5 passenger
body; same size tires all round—30 inch by 3½ inch;
speed up to 50 miles per hour—sixty stripped;
equipped with everything the motorist needs for a
trans-continental tour—Prest-O-Lights; tire holder;
wind shield, top and Jiffy Storm Curtains.

You can't buy more of efficiency, of reliability,
security or economy of up-keep at any price.



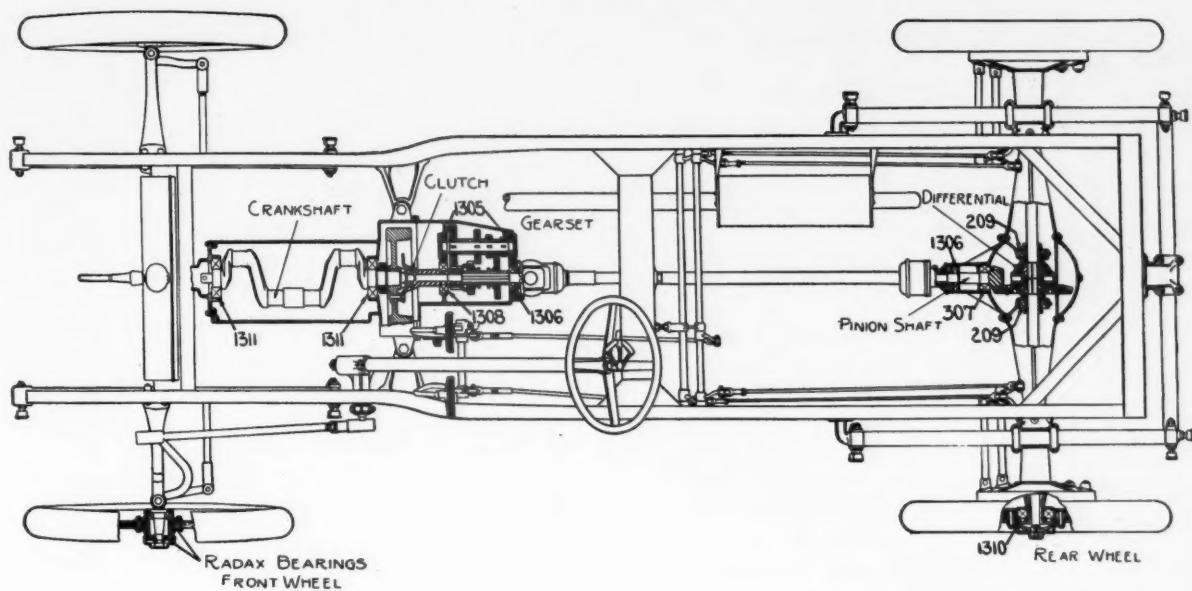
We plan to make 30,000 cars of this model for 1914. Deliveries are now under way.
Demand tremendous, so your order should be in your local Maxwell dealer's hands now
if you hope to secure one in the near future.

Maxwell Motor Co.
Detroit, Mich.

American Made for American Trade

NEW DEPARTURE

Ball Bearings Throughout and Why



BY the use of New Departure ball bearings throughout the entire Chassis, the manufacturer of this car has reduced power losses, repairing and operating costs to a minimum.

New Departure ball bearings eliminate friction. Friction is expensive, wears away the parts, hastens depreciation, and makes frequent repair necessary.

By eliminating friction New Departure ball bearings waste so little of the motor energy that maximum driving power is transmitted to the rear wheels. By eliminating friction there is practically no wearing away of the parts. The life of the entire car is longer and repairs are fewer.

All of these advantages are secured without sacrificing bearing efficiency. New Departure ball bearings will carry the load under all conditions of service equally as well as any bearing made.

Have you seen our interesting brochure on "Friction Elimination"? If not, drop us a card today and it will be forwarded to you by return mail.

NEW DEPARTURE MFG. CO., Bristol, Conn.

Western Branch, 1016-17 Ford Bldg., Detroit, Mich.

Add the BOSTON STARTER to your Ford Car

Your FORD car may have every known accessory which makes for comfort, convenience and utility, but unless you have a self-starter on the car you are **not** getting the utmost enjoyment from it.

No doubt you are aware of this. But you hesitate to pay \$200 for a starting outfit to go on a \$600 car. **And you need not do so.**

The BOSTON STARTER is a mechanical device which will do everything that a gas or electric starter will do and at a **fraction of the cost of either**—and with absolutely no upkeep expense.

The BOSTON STARTER is built especially for FORD cars. A pull on the handle located on the dash, transmits the energy to the motor, instantly. There are no delicate springs to get out of order and no gas tanks or storage batteries to cause annoyance. Any practical motorist can install a BOSTON STARTER quickly and easily.

To appreciate fully the convenience of a FORD CAR you **must** have a self-starter; and you can't make a **better** investment than in a BOSTON STARTER.

Write for our literature

MANUFACTURED BY

AUTOMATIC APPLIANCE COMPANY

172 Columbus Avenue
Boston, Mass.

803 Citizen's Building
Cleveland, Ohio

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GEO. R. WITTINGTON,
271 Canal St.,
Providence, R. I.



*Are You a Live Dealer?
Then This is a Message to You.*

Prediction

¶ We predict that 1914 will see, in the universal popularity of the *Light Weight Sixes*, as startling a revolution in the automobile industry as the introduction of the Fore-Door brought in 1911 and Electric Lights and Crankers in 1912 and 1913. It is bound to come.

¶ Europe has had them for two years—there they have entirely supplanted the big Sixes.

¶ Here in America the most up-to-date manufacturers are getting ready to produce them as fast as they can line up their equipment, production and dispose of their other material and contracts.

¶ As did the early cars equipped with Fore-Door bodies, and as did the early reliable Electric Cranked Cars, so will the *Light Weight Sixes* lead in sales for 1914, and carry with them, automatically, the Dealer who can supply them.

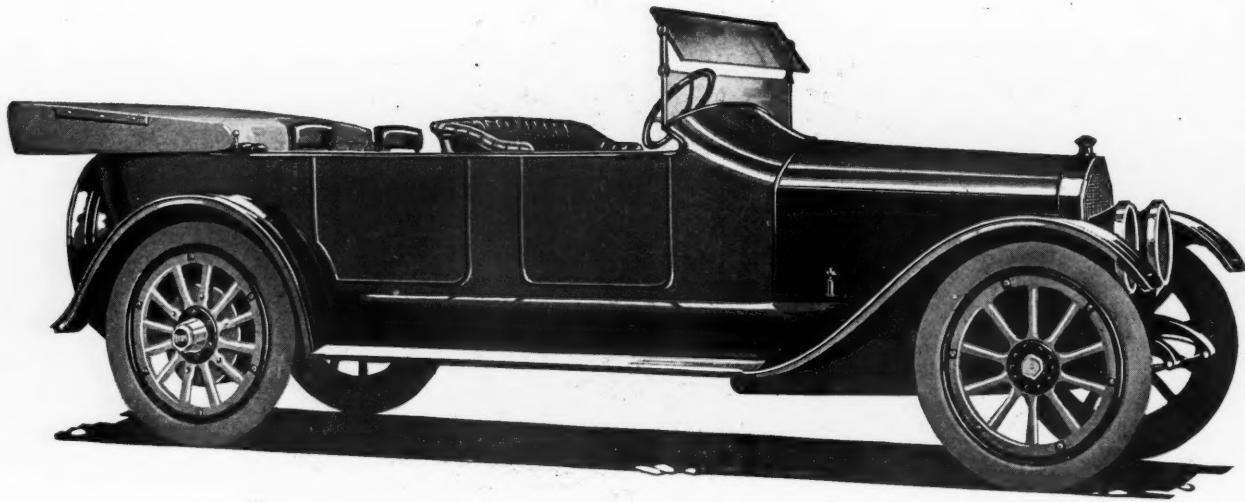
Reason

¶ Everyone would like to own a *Six*.

¶ Sixes have always been a synonym for evenness of Torque and smooth running, but they cost too much to run because up to this time in this country *Sixes* have always meant 4500 to 5000 pound cars with big motors and expensive tires.

¶ In the *Light Weight Sixes* though, to be produced in America, for the first time in 1914, motors will weigh no more than the same power four-cylinder motor and will be placed in cars of the same weight as the majority of Fours selling around \$2,000.

¶ These *Light Weight Sixes* will be able to do exactly as much as the big, heavy, expensive *Sixes* at less expense in gasoline consumption and other up-keep cost because the pounds of weight per horse-power are identical.



Light Six-50 Streamline

Price	\$2,150.00
Six or Seven Passenger	\$2,225.00

Fully equipped, including *Delco Lighting, Cranking and Ignition.*

A d v a n c e c t e r F e a t u r e s

Read the features—study the specifications—they make a mighty strong and comprehensive reason why it should be the Moon Car.

Notes the Streamline Body—the gradual taper without angles or breaks from the tip of the Radiator to the back of the car. This is a brand new creation—a pure design, not a compromise—without it no up-to-date line of cars is complete.

Next—the extremely large doors carried on concealed hinges—making the body lines entirely smooth, without projections or disfigurement. *And our special wind shield* designed as a part of the cowl and not something added to or built on.

The clear running boards. The gasoline tank and Tire carriers in the rear. Left hand drive and center Control. Both front doors opening.

Low swung body, trimmed with our own type of Dutch upholstering—"fits the back."

Four speeds ahead and reverse, with direct on third, adding greatly to the life of the car.

Delco Electric Lights—Electric Cranker—Ignition with automatic spark control.

Instrument board, under cowl—see specifications. Disappearing seats, motor tire air pump, taper hood.

Specifications for Model Six-50

MOTOR—Six Cylinder, cast in triplets, 8 1/4 x 5 1/4, developing 54 horsepower on dynamometer test, weight 500 pounds.

CRANK SHAFT—Three Bearings; 2 1/2 inches in diameter, special heat treated steel.

DELCO IGNITION—THE NEW DELCO Automatic Advance giving a full hot spark at low speeds as well as high, automatically advancing spark in ratio to the engine speed, thus adding long life to the Motor Bearings.

DELCO CRANKER—THE NEW DELCO 6-volt Cranking System with patented automatic battery regulation, spins Motor continuously for twenty-two minutes.

DELCO ELECTRIC LIGHTING—THE NEW DELCO 6-volt Single Wire System eliminating entirely return wires.

DELCO SWITCH—Controlling ignition, starting, and lighting, set flush in Instrument Board.

TRANSMISSION—Selective type; four speeds ahead, one reverse; mounted on six imported Annular Bearings, guaranteed for 90 horsepower; Gears of Chrome Vanadium steel, heat treated.

TIMKEN BEARINGS—In rear axle—full-floating. Housing, one-piece crucible steel, tested to 11 tons. Bearing Seats integral with Housing, insuring permanent alignment of Differential and Pinion.

FRONT AXLE—Drop forged, I-Beam.

WHEEL BASE—123 inches.

DRIVE—Left side.

RADIATOR—Genuine Honey-comb.

CLUTCH—Multiple Disc.

TIRE—38 x 4 1/2.

RIM—Quick Detachable and Demountable; extra Rim.

PORTABLE LIGHT—Complete with Switch on Instrument Board.

GASOLINE TANK—25 gallon capacity suspended on rear with Gasoline Gauge.

TIRE PUMP—Motor driven, equipped with Hose Connections and Gauge.

HORN—Electric under Hood.

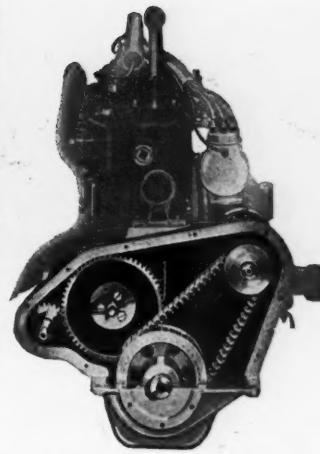
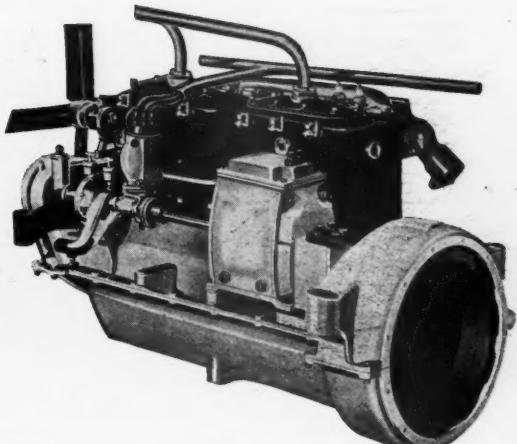
TOP—"MOON Special" imported Silk Mohair with Collins Patent Curtains.

INSTRUMENT BOARD—Under Cowl, illuminated by two concealed lights. Delco Switches, Regulator and Automatic Starting Button, Speedometer, Eight Day Clock, Hand Pressure Pump, Air Gauge, Air Adjustment for Carburetor, Portable Light Switch, and Locker for convenience of driver, all set in flush, and within comfortable reach of driver.

Six-50 Motor

$3\frac{3}{4} \times 5\frac{1}{4}$

Showing Delco
Distributor and
Cranking Generator.



Front View of Six-50 Motor

Not a Venture—

Analyze the Six 50 for Yourself

¶ A thorough appreciation of the expense and short comings of the Big Sixes and a realization of the value, perfection and popularity of the European Light Weight Sixes prompted our engineering corps to design and perfect as early as a year ago a Light Six Motor. Then we commissioned the Continental Motor Manufacturing Company to build the motor—and not until this motor had fulfilled our every requirement and stood the most rigid tests, was it accepted. The motor is light, weighing but 590 pounds, $3\frac{3}{4} \times 5\frac{1}{4}$ stroke; yet it develops 58 horse-power on dynamometer test, at 1800 revolutions a minute.

¶ Absolutely—the manufacturing of this motor is a scientific, laboratory proposition to which all the fine skill, accuracy and inspection detail of the enormous Continental plant is devoted.

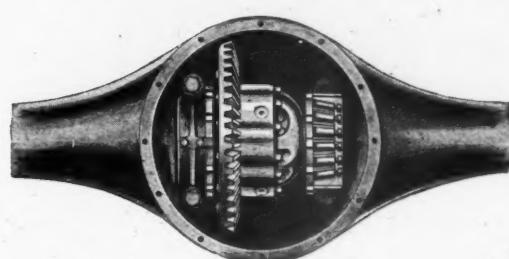
¶ Add to this single important feature of motor quality—the equipment feature—the New Delco Cranking, Lighting and Ignition with automatic spark control advance, the very latest in the electrical equipment for motor cars and you will understand why "the power plant" of the Moon Light Weight Six is just about perfection.

Now here is another point. The Six 50 Motor, as we have said, develops 58 actual horse-power, yet the car fully equipped for the road weighs but 3480 pounds. This gives a ratio of horse-power to the car which cannot be approached in the big Sixes, and with a correspondingly more favorable action on the road with easy control. The gasoline economy of the small cylinders over the large is pronounced, while the great reduction in weight of the complete car insures an economy on tires which appeals at once to the prospective owner.

Note carefully this most important detail—The Rear Axle made in our own shops under personal inspection. Of the full-floating type with one piece crucible steel housing which is tested to 11 tons—extra large differentials, and mounted on Timken roller bearings.

Absolutely in every way the best and strongest rear axle possible to put on a motor car.

Look at the picture of The Instrument Board—placed right under the cowl, convenient to reach—complete—everything flush. Hand pressure pump, air pressure dial, carburetor adjustor, Delco switch plate, portable light socket, speedometer, 8-day rim wound clock, locker. And two lights on the dash for illumination.

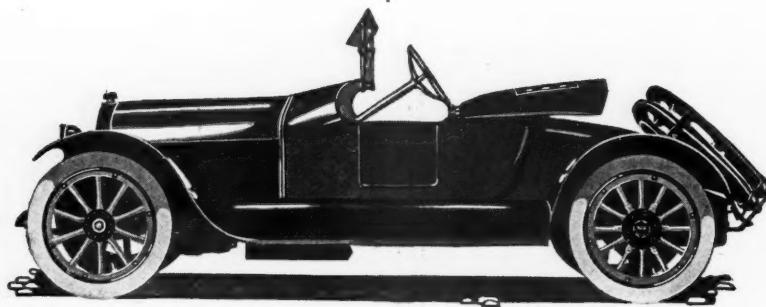


Moon Roadster

Model FOUR-42 \$1750.00

Model SIX-50 \$2150.00

Fully equipped, including
*Delco Electric Cranking,
Lighting and Ignition.*



F inally

¶ We have told you in our prediction why the opportunity is here for *Light Weight Sixes*. We have shown you that the industry in 1914 is to undergo one of those sales revolutions similar to those in 1912 and 1913 following the introduction of the Fore-Doors and Self-Starter.

¶ Now then, we ask you to apply your knowledge of the motor car situation, your clear, logical judgment to everything we have said. Is it not sound? Every bit of it?

¶ Then the question is, which are you going to be—the dealer who realizes the demand and has the type of car the public is rushing to, or the one who, not having it, has to argue, make excuses and drag a few reluctant sales out of half persuaded buyers.

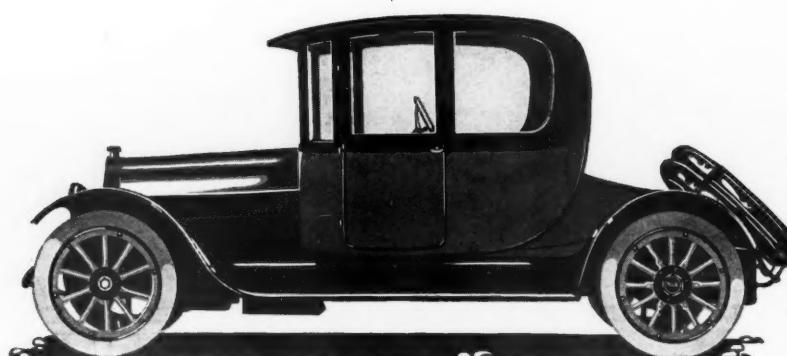
¶ Are you going to supply the *demand* or are you going to try to convince the public that it is wrong in its demands? Are you going to take the lines of least resistance or saddle yourself with a burden that does not meet the demand? You are a live dealer—a thinking dealer. Choose. You have chosen. Then, get ready to show this Fall a *1914 Light Six*. *The Moon Light Six, if the territory is open for you.* Wire or write and we will accord you immediate attention.

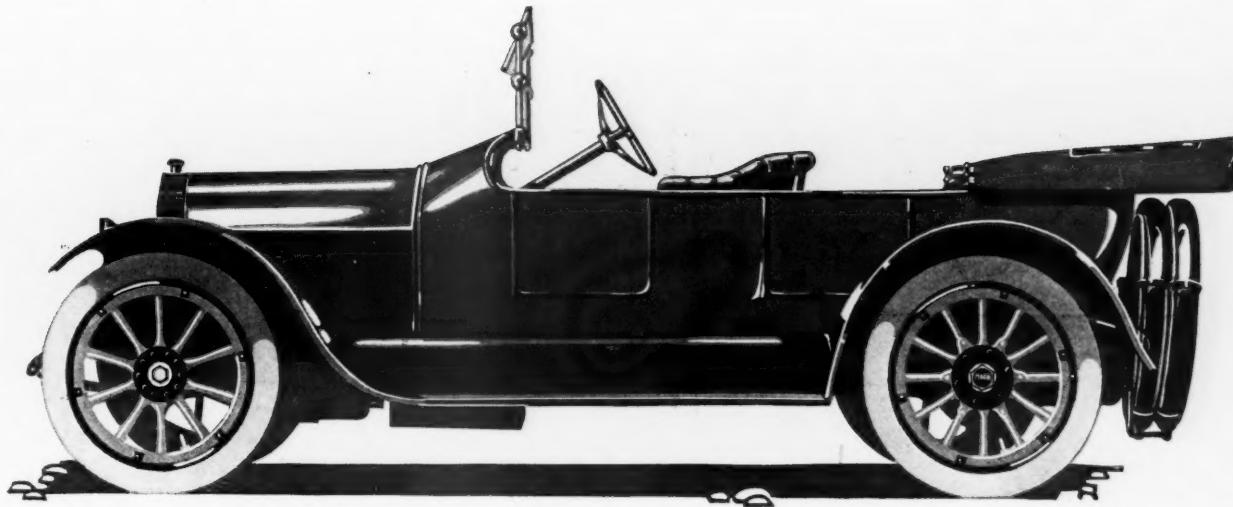
Moon Coupe

Model FOUR-42 \$2350.00
Model SIX-50 \$2750.00

Fully equipped, including
*Delco Electric Cranking,
Lighting and Ignition.*

Observe the sashless windows, the comfortable width of driving seat, Gasoline Tank in rear. Compartment for carrying spare tires, unsurpassed finish of detail, all windows dropping, making a delightful car for winter, as well as summer.





The New Four-42

Price, Complete \$1750

Touring—Torpedo—Roadster—Speedster

Fully equipped, including *Delco* Lighting, Cranking and Ignition

The New Four-42

But don't overlook this fact—4-cylinder cars at the right price are going to be good sellers too. No line is complete without a roomy, powerful and substantial 4-cylinder car.

Note These New Features

The Moon *New* Four-42 is a bigger, more roomy Four than ever—greater power and with every new and modern convenience and improvement in equipment.

Wheel base 118 inches.

Delco ignition, starting and lighting with automatic spark control—the *Delco* switch set flush in instrument board.

Gasoline Tank carried on rear.

Instrument Board—a new type—see specifications.

Originality and grace of body designs—see illustrations. Yale lock on switch control, locking car against theft. Left Hand Drive and Center Control. Clear Running Boards. Collins Curtains.

Now Read These Specifications

MOTOR—Four Cylinder, T-Head type, cast in pairs, 4 1/2 x 5, developing 42 horsepower on dynamometer test.

CRANK SHAFT—Three Bearings; 13 1/4 inch Diameter; special heat treated steel.

DELCO IGNITION—THE NEW *DELCO* Automatic Advance, providing a full hot spark at low speeds as well as high, automatically advancing spark in ratio to the engine speed, thus adding long life to the Motor Bearings.

DELCO CRANKER—THE NEW *DELCO* 6-volt Cranking System with patented automatic battery regulation, spins Motor continuously for twenty-two minutes.

DELCO ELECTRIC LIGHTING—THE NEW *DELCO* 6-volt single wire system, eliminating entirely the return wires.

DELCO SWITCH—Controlling ignition, starting, and lighting, set flush in Instrument Board with Yale Lock controlling entire system.

TRANSMISSION—Selective type; three speeds ahead, one reverse; mounted on five imported Annular Bearings, guaranteed for 70 horsepower; Gears of Chrome Vanadium steel, heat treated.

TIMKEN BEARINGS—In rear axle—full-floating. Housing, one piece crucible steel, tested to eleven tons. Bearing seats integral with Housing, insuring PERMANENT ALIGNMENT of Differential and Pinion.

FRONT AXLE—Drop forged, I-Beam.

WHEEL BASE—118 inches.

DRIVE—Left side.

RADIATOR—Genuine Honey-comb.

CLUTCH—Multiple Disc.

TIRES—34 x 4.

RIMS—Quick Detachable and Demountable; extra Rim.

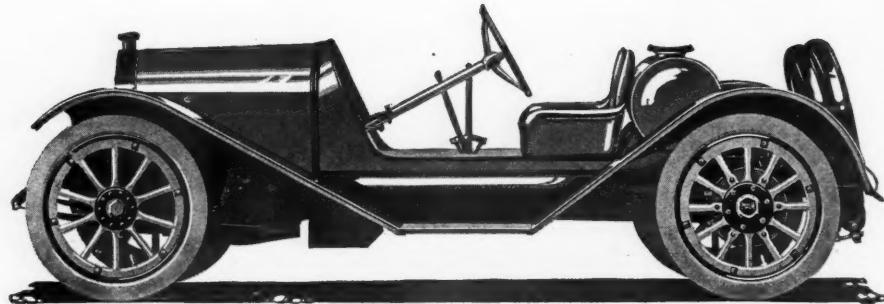
PORTABLE LIGHT—Complete, with Switch on Instrument Board.

GASOLINE TANK—25-gallon capacity suspended on rear with Gasoline Gauge.

HORN—Electric, under Hood.

TOP—“MOGN Special” imported Silk Mohair with Collins Patent Curtains.

INSTRUMENT BOARD—Under Cowl, illuminated by two concealed lights. *Delco* Switches, Regulator and Automatic Starting Button, Speedometer, Hand Pressure Pump, Air Gauge, Air Adjustment for Carburetor, Portable Light Switch, and Locker for convenience of driver, all set in flush, and within comfortable reach of driver.



Parkway Speedster

Model FOUR-42 \$1,750.00
Model SIX-50 \$2,150.00

Fully equipped, including *Delco Electric Cranking, Lighting and Ignition.*

During the past two years our New York City Dealers, in order to fill the demand for a fast, distinctive type of Speed Car, placed special orders for the Parkway Speedster and the popularity of this Model has prompted us to make it standard.

Built Upon Experience

¶ The Model 42 Moon Four is the result of three years progressive refinement upon one model.

¶ The performance of the car each day of each season has been watched and studied to the end of finding where improvement and refinement could be made in each part and in the car as a whole.

¶ The performance of everything new and promising in the way of equipment and devices in the motor car world has been watched with the same vital desire to find the best and adopt it for use in this car.

¶ The *new* Moon Four, Model 42 has a greater wheel base which makes easier riding.

¶ *The Motor* of this car is the result of steady development of three years work on this model—it embraces these exceptional features. Four bolt connecting rods, four-ring pistons (a sure prevention of leakage and therefore perfect conservation of power), $1\frac{1}{2}$ inches of main bearings on crank shaft—you will readily see what this means. In all, you have a motor which is *very* powerful and with practically no vibration.

¶ *Our New Delco Equipment* is included in this model. This is a great forward stride. Delco cranking, lighting and ignition with automatic spark advance, *proved* to be the final word in such equipment and for the first time found in a car of this price.

¶ And we have not kept all our improvements for the *Six 50*—it shares many of its features with Model 42—the *Instrument Board* on this car is an exact duplicate of that installed upon the higher priced *Six 50*.

¶ *And the Rear Axle*—this axle is of special Moon design and is manufactured in the Moon shops. Consists of a single piece, crucible steel housing, each one being tested to stand the weight of eleven tons. $4\frac{1}{2}$ pitch Differential gears mounted upon Timken bearings.

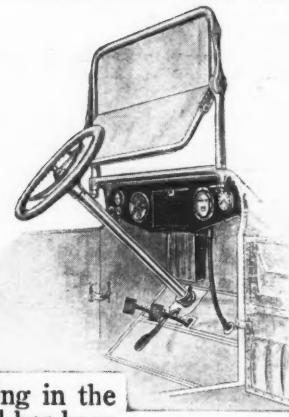
A nice feature is the Yale lock on Ignition, preventing theft of car. Moon cowl with wind shield, built in, instead of being a mere attachment—this is a feature of looks and stability that will appeal strongly.

Collins patent curtains.

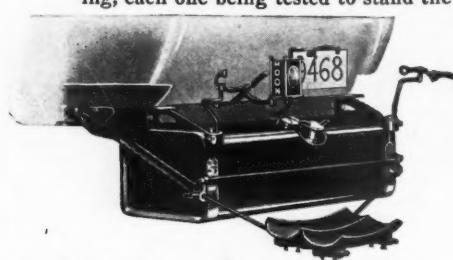
Gasoline tank in rear with Gauge—the latest type.

So you see—nothing—not the smallest detail has been overlooked to make this car complete, handsome, comfortable and strong and powerful.

It is the gospel of the Moon.



Instrument Board



Gasoline Tank and Gauge on Rear of Car

Our Policy—*What is it?*

¶ You have a policy—whether you've ever put it into words or not. ¶ Every concern that ever amounted to a hill of beans has had some definite policy. Ours is simple. Good, and strong for that very reason. ¶ We believe that cars well built and rightly sold will sell more cars the next year and give the *reason* for building more cars. ¶ For the foundation of it all—that without which all the power in the world can't make a satisfactory car—is stamina. You've got it in the Moon. Absolutely there's not a part—not a screw or a nut or a bolt even in the Moon that's not as near perfect in strength and quality for doing its part, as human ingenuity and sterling honesty can guarantee. ¶ A Moon motor car is put together like a prescription—every "ingredient." The parts we make—made of the finest materials by conscientious as well as skilled workmen. Every part we buy, made by the most famous makers of the best parts.

¶ For example—we use TIMKEN Roller Bearings; as you well know "Timken" stands for the best in bearings.

The Curtains—they're COLLINS—they're standard.

SPICER Joints—universally recognized.

BROWN-LIPE Differentials—best.

DELCO Electric Lighting, Cranker and Ignition—the first word and the last word in this type of equipment.

PARSONS White Bronze in crank shaft bearings—the metal that is specified by the United States and other Governments for use in high speed bearings in naval vessels.

WARNER Transmission—Warner stands first.

¶ The men who build the car—trained to *know* that every part fits every other part exactly and absolutely.

¶ We back up our dealers in their *generous* treatment of their Moon customers. *Service*.

Our dealers are making money—enthusiastically.

That's our policy—was there ever a better?

Your Policy

¶ Here's a hint.

¶ The whole thing is—here's a demand—be ready to supply that demand—show the buyer comfort and class—convince him of quality—let the price speak for itself and the *sale* is made.

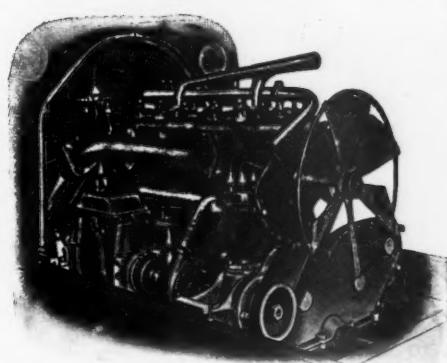
¶ Has the Moon comfort? Read the specifications—look at the pictures—it's not comfort, it's luxury.

¶ Has the Moon convenience? The driver of a Moon car becomes but a director of forces, not a manual laborer—you know what we mean by that. Everything handy—minimum reaching—machinery does it all, simple machinery at that.

¶ Has the Moon looks? Looks alone won't sell a car but they're a mighty important factor—if they *were* all, then all you'd have to do would be to show the Moon; for it's *classy*—graceful—complete.

¶ Then with the car backing up in every particular every word you've said, you've got a friend and the car has a user-salesman (*working for you*).

¶ It's a good theory to go on—it's the theory that has made money for Moon dealers—that has kept Moon dealers as Moon dealers—that will make you a Moon dealer and make money for you.

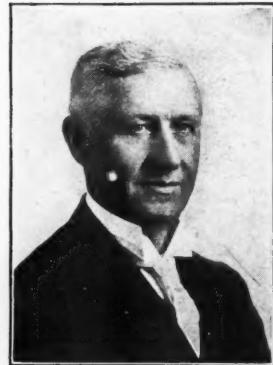


FOUR-42 MOTOR, 4 1/2 x 5
Showing Delco Distributor and Cranking Generator

T

To the Dealer

—a Last Word



¶ This is no "Hurrah! boys-come-on-in-and-make-money" talk,—you can read it to Mr. Customer.

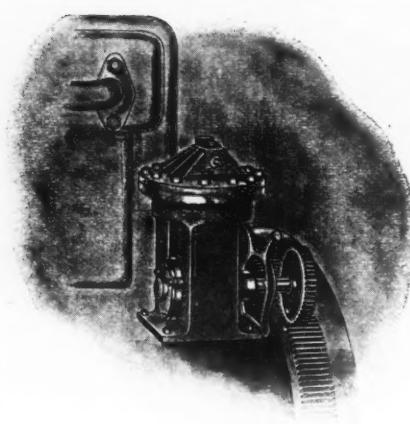
¶ Frankly—we are just as discriminating in our choice of dealers as *good* dealers are in the choice of the car or cars they decide to represent.

¶ A dealer who knows motor cars, who knows his trade and can tell a demand when he sees it is just the dealer and the only kind of dealer we want to talk business to. The man who wants to be a motor car dealer with the idea that the name and reputation of the car and its extensive advertising without his *study* and *Co-operative* selling efforts will be all that's required—frankly we can't do business with him.

¶ But—the man who is willing to tie his best efforts to a car that answers a genuine demand and that will back up his selling talks—that will bring him inquiries but that he *must* sell on its merits after the buyer is in the place—*he* is the man we want as a dealer, because he'll make money for himself and for us. We have openings for a few such high grade dealers in new or shifted territory.

¶ So finally,—the demand is upon you. The Moon Light Six and the *New 42* are the answers to that demand.

¶ *Write—phone or wire and we'll send a representative and proofs that will make you ask to be the Moon man in your territory.*



J. W. Moon.

President.

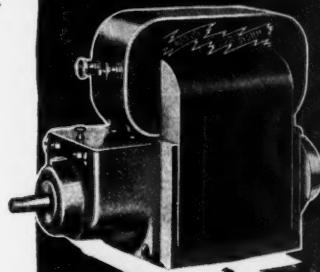
Moon Motor Car Co.

Air Tire Pump as Installed on Six-50

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current for motor car
electric lighting.

Built with magneto dimensions - designed to be connected direct to magneto or pump shaft - operates at 6 volts - begins to generate at 200 revolutions per minute - attains maximum output at car speed of 17½ miles per hour.

YOUR 1914 car should carry the Auto-Lite system as standard equipment — no matter what price you pay.

Due to its already wide spread adoption, car manufacturers can equip with the Auto-Lite if you so specify.

For the manufacturer who desires lighting, starting and ignition in one system or separate units, we are able to provide the best recognized equipment now in use.

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FOR YOUR TOUR

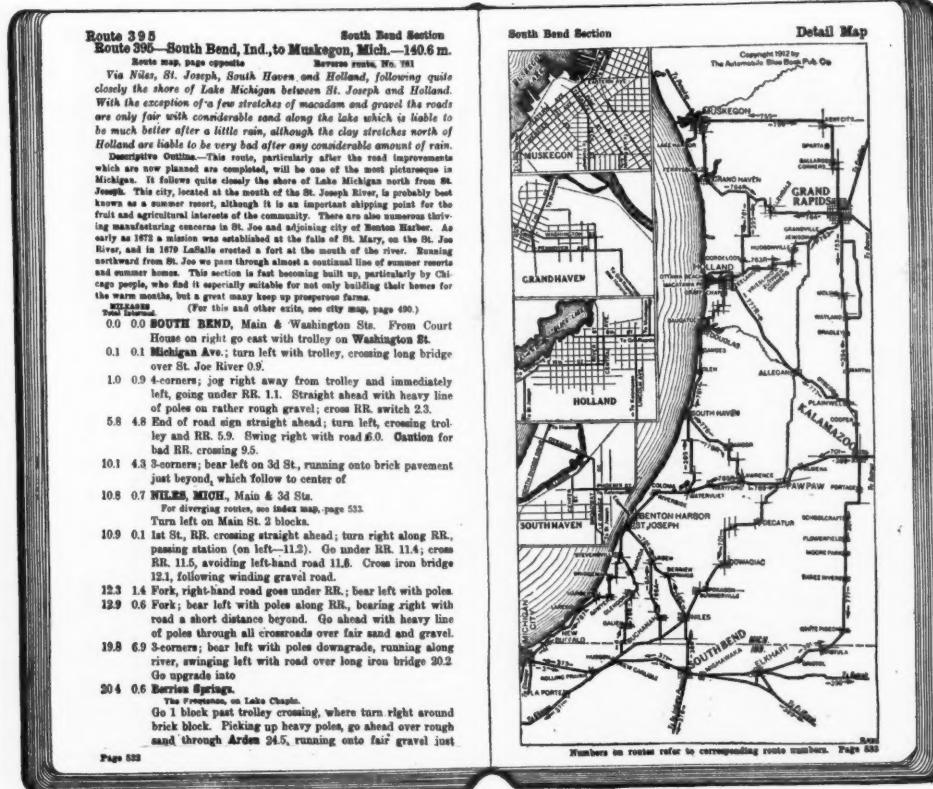
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With Gray & Davis Electric Starter and Generator—\$1075

THE 1914 Overland can now
be seen in every part of
America. See the nearest Over-
land dealer at once.

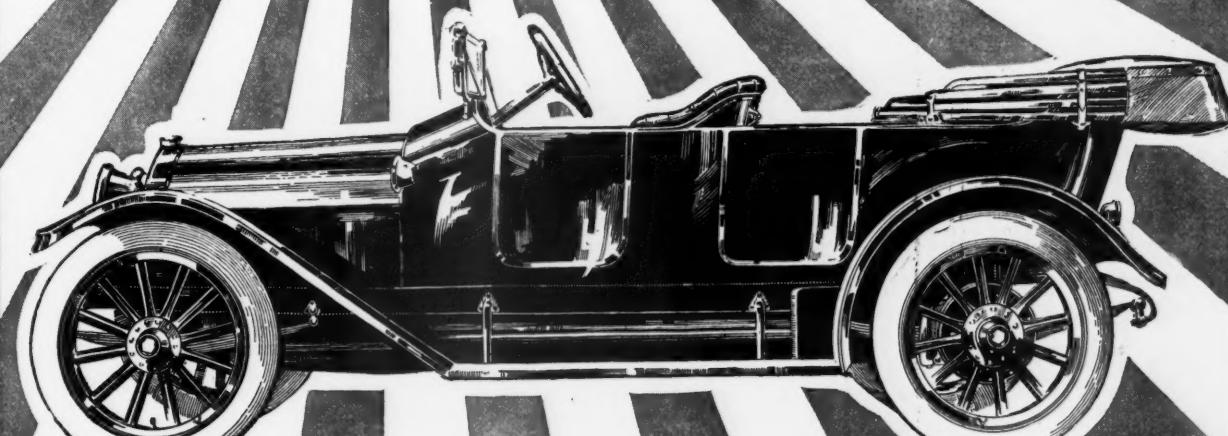
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Toledo, Ohio



"Soot-Proof" Spark Plugs Never Balk— Over 2,000,000 Prove It



Not all spark plugs will carbonize.

Not all get dirty, grow weak or short circuit.

And not all spark plugs call for frequent replacement.

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This plug is warranted to clean itself. It never clogs, never leaks, never short-circuits. And it lasts for years.

Its use forever ends all spark plug worries.

It is built with a double chamber. Thus it offers at least three times the resistance of any other spark plug made.

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This has all been proved to hundreds of thousands. For over two million "Soot-Proof" plugs are now in use on the leading cars of America.

One "Soot-Proof" plug will prove this to you. If you have any doubt, use old-type plugs with it. Note the difference in results.

Do this now. Think what it means to have spark plug troubles forever wiped out. This spark plug will do it—that is guaranteed.

Get them from your dealer. If he can't supply, find a dealer who can. Or send to us direct. In replacements alone these "Soot-Proof" plugs will save many times what they cost you.

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See the KING—then buy! It's fairness to yourself. You can't afford to purchase *any* car until this highest of motor values has been investigated. The KING offers *more* service, comfort, style, and convenience than can be had in any car near its price, and has desirable, patented features which *no other* car can offer.

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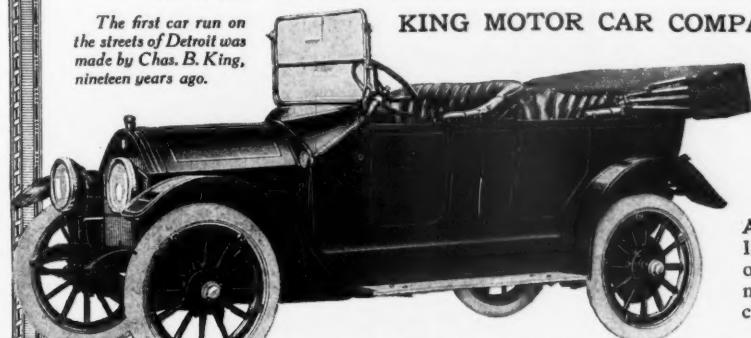
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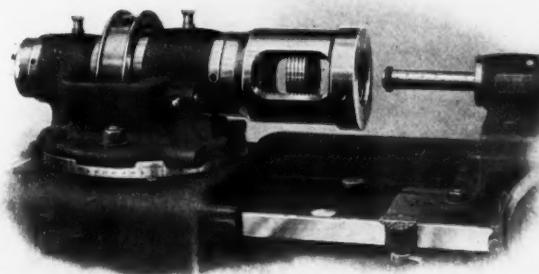
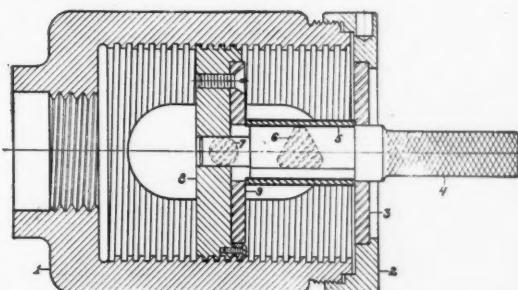
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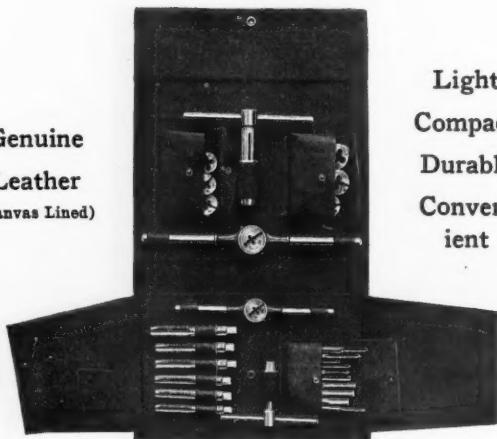
Because each HEALD grinding machine is designed for a special purpose, to do common things uncommonly well. HEALD INTERNAL GRINDING MACHINES are made for the express purpose of grinding holes, nothing else. Any progressive country doctor may be all right to handle a case of measles, but for the latest up-to-date information you would call on a specialist. For the same reason, if you have any holes to grind you should call on us because we are specialists in this line.

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The Snubber Principle is entirely different from that of the Shock Absorber. It is as much an improvement over old-style devices as modern cars surpass the old models. We used to make Shock Absorbers—thousands of them—until the advent of modern, high-set, flexible springs demanded a radical improvement.

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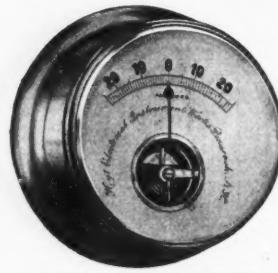
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TYPE 22 AMMETER

The Call for the Small

WITH the almost universal application of electric lighting to the gasoline pleasure car has come an imperative demand for smaller meters. This is but natural, as the dashboard space is limited, and the space requirements many.

Six years ago the Hoyt Electrical Instrument Works recognized the value of meters in promoting the efficiency of the gas car and designed their Type 25 Ammeters and Voltmeters for the purpose. This was the smallest practical switchboard meter on the market, and was but 3" diameter over all.

Thousands of them in constant use on pleasure cars the world over testify in the strongest possible manner of their value as an aid to efficiency.

Recognizing the popularity of Hoyt Type 25 meters, other electrical instrument manufacturers are now making 3" meters, but even the 3" meter has been found to be too large, and the call is heard on every side for something still smaller. The Hoyt Type 22 meter is the response. 2 $\frac{1}{4}$ " diameter, accurate, rugged, reliable.

Many 1914 cars will carry these meters as regular equipment.

Ask for Bulletin Number 7.

Hoyt Electrical Instrument Works
PENACOOK, N. H.



"Near Enough"—

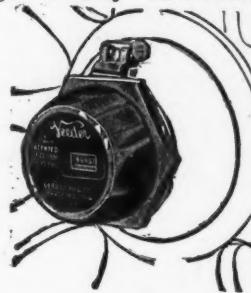
won't do, if you want to know the exact cost of upkeep of pleasure or commercial vehicle. Mileage must be correct to a fraction if you are interested in tire, gasoline or "juice" and lubricating consumption. Exact mileage is only obtainable with a VEEDER HUB ODOMETER — which can't be tampered with.

Neat, durable and compact, it can be easily attached. **\$25.00**
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Solid Brass



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Easily and quickly attached to valve stem, they take the place of the cap. Compactly made and reduced to the smallest possible size compatible with strength and durability.

Prevents Rim Cutting — Lessens Blow-Outs and Blisters

Running on low air pressure shortens the life of a tire more than any other cause. The Polo Pneumatic Alarm advises you instantly when the pressure falls below a given point, by giving vent to a shrill whistle.

Sold in sets of four, at \$8.00 per set.

We invite inquiries from dealers and auto users.

Write for descriptive folder

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Clear Lake, So. Dak.



The Foreign Trend

The builders of motor cars abroad are constantly introducing new ideas, new body designs, new equipment, and new methods of construction.

There are wire wheels and worm drive now. And other things are promised.

But some things there, as here, are standard.

One is The Jones Speedometer.

Seven years ago The Jones became Europe's most popular speedometer.

It won the Royal Automobile Club's gold medal for all around superiority in a test that covered 2,000 miles and lasted 30 days.

It was placed on the cars of the King of England, the Emperor of Germany, the Czar of Russia, the King of Italy, the King of Spain, and the Kings of Siam, Norway, Sweden, Denmark and Belgium. The President of Switzerland and the President of France, and hundreds of other notables used it. It is used by these rulers and thousands of others on the best cars today.

No other speedometer ever gained such prestige or was ever so widely sold abroad.

No other sells there today like the Jones. The love of new things—the foreign trend—doesn't dislodge the Jones.

It is regarded as the Standard Instrument because of its accuracy. And nobody ever thinks of displacing it.

The makers of thousands of American cars are factory-equipping their product this year with the New Jones Speedometer.

They expect their cars to be used the year 'round and they know the Jones isn't affected by temperature.

The Jones is the Universal Speedometer. Makers and owners are finding this out. It is accurate, *always*. The simplest in principle. And the longest lived.

It's the product of Jos. W. Jones, the inventor of the speedometer as used on motor cars. Nothing else will ever serve like the Jones Speedometer.

Let us send you the man who knows it in detail and can give you the fullest information in regard to placing it on your car.



This is the gold medal presented to The Jones Speedometer by the Royal Automobile Club of Great Britain and Ireland. Eleven different instruments competed in the test—foreign and American Makes. The Jones made the only perfect score on seven points of superiority.

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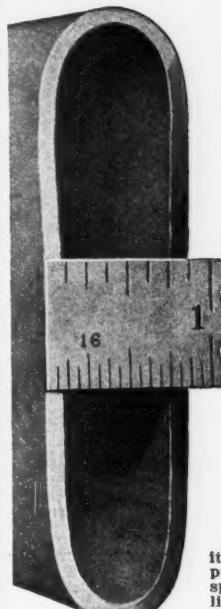
THE JONES SPEEDOMETER Broadway at 76th Street NEW YORK CITY

Branches New York, Broadway at 76th St.; Boston, 109 Massachusetts Av.; Philadelphia, 1427 Vine St.; Chicago, 1430 Michigan Av.; Baltimore, 217 W. Saratoga St.; Detroit, 872 Woodward Av.; Buffalo, 20 Goodrich St.; Pittsburgh, 5904 Penn Av.; Cleveland, 1845 Euclid Av.; Charlotte, 209 Church St.; Memphis, Madison Av. and Fourth St.; Minneapolis, 800 Hennepin Av.; Omaha, 1608 Harney St.; San Francisco, 1436 Van Ness Av.; Los Angeles, 408 W. Pico St.; Portland, Ore., 71 Seventh St.; Seattle, 1710 Broadway; Indianapolis, 1201 State Life Bldg.; Atlanta, 35 N. Pryor St.; New Orleans, Baronne and Perdido Sts.; Birmingham, 18 S. 20th St.; Denver, 1600 Broadway; Newark, N. J., 283 Halsey St.; Albany, N. Y., 133 Hudson Av.

Foreign Agencies J. Millet & Son, Ltd., Montreal, Toronto, Winnipeg, Vancouver; Markt & Co. (London), Ltd., London; Markt & Co., Hamburg, Milan, Vienna, Barcelona; A. A. Kampfraath (Brussels), Ltd., Brussels, Amsterdam; Severin & Co., St. Petersburg; G. Bruggemann, Moscow; Y. D. Rose, Paris; William D. Easay & Co., Sydney, Australia; The Tarrant Motor Co., Melbourne, Australia; C. E. Helvie, Manila, P. I.; Adams, Ltd., Christchurch, New Zealand; Markt & Schaefer, Co., Rio de Janeiro, Brazil; Buenos Aires, Argentine; Mexico City, Mex.; Habana, Cuba; San Juan, P. R.



A Red Tube Without Equal



That's a strong claim, you say. But we'll prove it—and we'll let you be the judge.

We will send you, on request, a sample section of a Marathon Stock tube. Compare the quality, strength, thickness, toughness and life with any other tube made, and you'll say Marathon is without equal.

Then if you want further proof, we'll send you a full tube, and if it isn't as good as the sample, we'll make you a present of it.

Now if you really want to sell the best tube made, write us for a sample section.

Note the Picture

The picture is from an actual photograph of a Marathon 34 x 4 stock tube section. Note that it is almost an eighth of an inch thick by the rule. That shows its great thickness.

Pure Gum, Too

Marathon is a pure gum tube. Not a compound tube. We use the finest rubber and give it greatest strength, toughness and life by our special formula.

Best We Can Make

We put all the quality—and the finest quality—into Marathon Red Tubes that can be put into a tube. No expense whatever is spared in building Marathons. We will not limit the quality of either Marathon Tubes or Tires.

6-ply Stock

To obtain utter perfection, we use 6 plies of finest rubber. (9 plies in 4 1/4 to 6 inch sizes.) That prevents the possibility of defect—and prevents slow leaks. Any possible, invisible defect in one ply is positively corrected by the others.

Weighed and Measured

Every Marathon tube is subjected to a double test for accuracy and uniformity.

The raw tube is first weighed and then measured. It must test to the fraction of an ounce

and the eighth of an inch, or it cannot pass.

Heat Resisting

We use a special red coloring matter that renders the pure rubber highly heat resisting. The Marathon Red Tube positively will not stick to the casting no matter what the friction heat or the weather conditions.

Dealers

We want exclusive distributors in every locality for this tube—and the Marathon tire. Write for a sample section and our special proposition.

The Marathon Tire

Remember these facts about the Marathon Tire. Marathon is hand built, very slowly, by experts. That insures utmost precision—insures perfect construction.

We use only Top Test materials—the finest rubber and costliest fabrics. No expense is spared to make Marathon the Top-Test quality.

We use a special Marathon single cure process, in open steam. That gives greatest rubber—toughness and unitizes the construction—all parts become one.

We apply a double tread—a thick plain tread, and a heavy angle non-skid above.

We concentrate the tread—put the rubber where the wear comes.

Write for our exclusive agency proposition.



THE MARATHON TIRE & RUBBER CO.

Cuyahoga Falls, Ohio

Distributors in most large cities

(106)

Starts—Lights—Ignites

REMY

Six Volt System—Does-It-All

HERE is only one real way to provide for the efficient starting, lighting and ignition of your car.

Have one manufacturer design and build all three systems; have this one manufacturer responsible for all three.

We are the only concern building the complete apparatus—either as a whole or in any combination—starting—lighting equipment—magneto, or battery ignition (generator and storage battery). The starting and lighting equipment is sold only to automobile manufacturers.

Write for our magneto exchange offer.

Remy Electric Company

General Offices and Works, Anderson, Indiana

BRANCHES:

New York Boston Detroit Chicago Kansas City San Francisco Minneapolis

(Service stations throughout the country)

It's hot work pumping tires this weather!

BUT
NOT
THIS
WAY

Nothing spoils a summer day's motoring so quickly as pumping up a tire by hand. Hot sure—you playing jumping-jack with the pump handle-perspiration streaming down your face. It's about the hardest job you ever tackled, isn't it?

You can get your motor to pump your tires for you if you simply harness it to a

MAYO SPARK PLUG PUMP

Try One
Free on
Your Car
for 30 Days



Instantly attached by substituting for any convenient spark plug—Pumps pure, fresh air only—Made with metal rings like your motor, and will last as long—Inflates largest tire in from 2 to 4 minutes—Weight 2½ pounds—Complete with 12 ft. of hose and connections.

Price \$10.00

(With pressure gauge, \$2.00 extra)

Mayo Mfg. Co.
55 East 18th Street
CHICAGO, ILL.



Your
Dealer has

Basline Autowline \$3.75

or he will get you one at once. Then you can tow or be towed when road trouble occurs, as it will sooner or later.

Coils Up Flat Under a Cushion

Basline Autowline takes up no room in a car as bulky manila rope does. It weighs only 5 pounds. But the wonderful Yellow Strand wire rope gives it strength to pull a big car out of a ditch—or all the way home. It's 25 feet long and can be attached for towing easily, quickly. Has stood every test for past two years. Get Autowline from your dealer today! What's \$3.75 compared with security, safety, motoring satisfaction?

FREE—Write for the fully illustrated Autowline circular

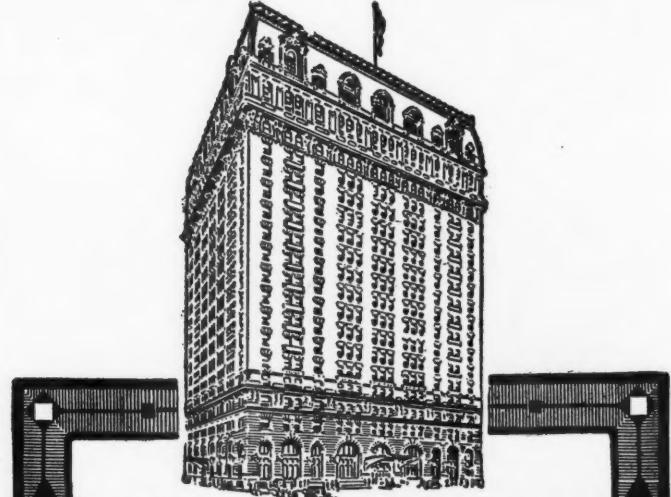
The Little Steel Rope with the Big Pull

BRODERICK & BASCOM ROPE CO.

813 N. 2nd Street

New York Office, 76 E. Warren St.

Manufacturers of FAMOUS YELLOW STRAND WIRE ROPE



Hotel La-Salle

CHICAGO'S FINEST HOTEL

ERNEST J. STEVENS, Vice-Pres. and Mgr.

Located in the heart of the city, within easy reach of all railway terminals

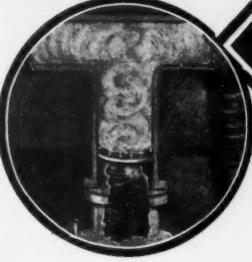
RATES

ONE PERSON	Room with detached bath.....	\$2 to \$3 per day
	Room with private bath.....	\$3 to \$5 per day
TWO PERSONS	Room with detached bath.....	\$3 to \$5 per day
	Room with private bath.....	\$5 to \$8 per day

TWO CONNECTING ROOMS WITH BATH

Two persons	\$5 to \$8 per day
Four persons	\$8 to \$15 per day
SUITES	\$10 to \$35 per day

LA SALLE AT MADISON STREET, CHICAGO



MONDEX

AUTO DEVICES

Lead the World for Efficiency and Economy At Dealers Everywhere

MONDEX-HELIX GAS SAVER

Reduces Your Gasoline Bills 25 to 40 Per Cent

MONDEX POLISH For Auto Bodies and all varnished surfaces. Dries instantly, leaving a brilliant lustre. Send for Free Sample.

MONDEX SHOCK PREVENTERS

Reduce Your Repair Bills 100 Per Cent

Saves wear and tear of tires and eliminates all vibration

Motor Car Racing Says: "Mondex Shock Preventers proved they are right in the highest court of mechanical test known."

Write for Booklet "N"

Agents Wanted Everywhere

RELIANCE AUTOMOBILE CO., Agents for Pacific Coast, San Francisco, Cal.

THE ARISTOS CO.
250 W. 54th Street, N.Y.





Dept. of Chemistry—State Normal School, Westfield, Mass., May 31, 1913.

Gentlemen: This letter is entirely unsolicited, and we write it because we think it is due you to tell you how highly we regard the McCormick Power Plugs which you fitted for our Krit car. We get almost fifty per cent more power, and a greatly decreased gasoline consumption. We would not be without these plugs under any circumstances. We thank you for your interest, and your ability to produce an article of such merit. Yours very truly, L. B. ALLYN, [Pure Food Editorial Writer "Collier's."]

McCORMICK POWER PLUG

Full Firing Efficiency

The McCormick Power Plug takes the place of the spark plug. It develops and maintains maximum firing efficiency. This **must** produce more engine efficiency—**decreased** fuel consumption and **increased** power—other conditions being normal. Don't you want to eliminate the spark plug troubles which are now one of the big bugbears of your motoring days? You can do it with a McCormick Power Plug. It's the most efficient electrical firing device on the market. Send us the make and model of your car and we'll send a set on a 20 days' trial. If you're not satisfied we'll return your money.

SHIPPED PREPAID
Price \$2 PER POWER PLUG

McCORMICK MFG. CO., 440 E. First St., Dayton, O.
Exclusive territory to agents who will meet our requirements

Have You An Unsatisfactory Magneto?

Even if your motor has no timer shaft you can nevertheless install

The Atwater Kent Ignition System

by means of our "Magneto Gear Mounting." It fits the standard magneto platform and connects to the magneto drive shaft. The gears it contains are enclosed, smooth running and quiet in operation.

For one-half the price of a new magneto you can replace your old one with an Atwater Kent System which will run your motor as smoothly "on high" at three miles an hour as at thirty or fifty. If you are also interested in increasing the speed, flexibility and hill-climbing ability of your car, you will want a copy of our latest literature describing the Atwater Kent System.



WRITE FOR FOLDER "A"

4934 Stenton Ave.
PHILADELPHIA

ATWATER KENT MFG. WORKS

Will you accept this book, "10,000 Miles on One Set of Tires"—if we send it

FREE?

It tells how one car ran 11,000 miles, and is still running—and how, in all that distance, there have been only TWO emergency stops on account of tires.

It tells how half the motorists in France and Germany consistently get 10,000 miles service out of their tires—and how 20,000 Americans are already doing the same.

It tells how the gigantic sum of from \$150,000,000.00 to \$300,000,000.00 A. YEAR is literally thrown away in tires, and how YOU can save from \$50.00 to \$200.00 a year of this sum.

Never, in the history of the automobile, has such a book been written on the subject of tires—and it is backed by a legal binding guarantee of 5,000 miles without puncture.

All you have to do to get this book is to write for it.

It will be the means of adding 5,000 miles more service to the tires on your car.

Tear out this ad now, before you turn the page and forget—to surely remind you to write.

Colorado Tire & Leather Co.

1327 Acoma St., Denver, Colo. 450 Golden Gate Ave., San Francisco. 1111 Karpen Bldg., Chicago, Ill. 462 Fourth Ave., New York City.

The Oxy-Carbon Removing Outfit

Big Profits to Garages

Use the scientific method of removing carbon from engine cylinders. Most thorough, cheapest, quickest, safest, cleanest and most satisfying to your customer. You cannot afford to be without it.

Done in three minutes per cylinder. Costs fifteen cents per cylinder. Carbon converted into carbonic gas. No flakes to get under valves.

Something entirely new—200 in use in Boston already. Take out the valve cap, drop in a lighted match and pull the trigger. One look will convince.

It eliminates the knock and makes the car run like a watch. —One Tank of Oxygen will clean out 30 to 40 cylinders and this gas can be procured of any local Oxy-Acetylene Welding Shop or of the Manufacturers having Charging Stations at convenient points in various sections of the country.

Price to Garages, \$25.00

Dyer Apparatus Co., —39 Piedmont Street—
Boston, Mass.



U-S-L

U-S-L



Takes the place of the Fly-wheel

The U-S-L Electric Starter and Lighter is a combination motor and generator that takes the place of the fly-wheel. The armature of the motor-generator is bolted directly to the engine crank-shaft.

The U-S-L doesn't add a single extra moving part to a car.

No gears or chains
No added weight
No bearings to oil

No extra clutches
Starts at a push of foot-button
Supplies ample current

Adopted by
Rambler, Overland, Garford,
Edwards-Knight, Moyer, S. G. V.

Write for Bulletin 501

The U. S. Light & Heating Co.

General Offices: 30 Church St., New York

Branch Offices and Service Stations—New York, Boston, Buffalo, Cleveland, Detroit, Chicago, St. Louis, San Francisco.

**GET THIS
HEALER FROM
YOUR DEALER**

Cures a wounded
radiator in
fifteen
minutes.

SE-MENT-OL
"CHEMICALLY CORRECT"
No
TOOLS.
No TINK-
ERING.

Just pour it in.
Finds the leak and
fixes it.

By the makers of
CARBONOX, the greatest
of all carbon removers.

THE NORTHWESTERN CHEMICAL CO.
Marietta, Ohio.

**THE CHEMICALLY CORRECT
RADIATOR CEMENT**
Price 75¢
MANUFACTURED ONLY BY
THE NORTHWESTERN CHEMICAL CO.
Marietta, Ohio.

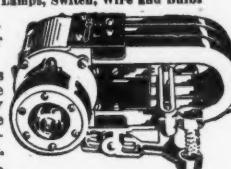
Improve the appearance and efficiency of your car by
installing the

K-W Electric Headlight Outfit, \$40

Complete Outfit: Generator, Head Lamps, Switch, Wire and Bulbs

Easy to install on any car having exposed flywheel or other place to drive the Generator.

Light Weight Generator weighs but 18 lbs. Compare it to the heavy complicated and costly charging units. If you have the Electric Head Lamps, get the K-W Electric Generator only \$25.



Can be
used for Ignition in connection with
Timer and Spark Coll.

Handsome
made-for-the-purpose
head lamps

No extra charge for black finish. The reflectors are set in the door against a felt ring to keep out dust and moisture. They are made of correctly formed brass heavily silvered and highly polished on the reflecting surface. Lamps alone, \$15 and \$17.

K-W Ford Electric Headlight Outfit, \$15 FOR FORD CARS WITH FLYWHEEL MAGNETO

The successor to the gas tank. The most successful electric headlight outfit for Ford cars, because it is especially designed and engineered to work in connection with the Ford Flywheel Magneto.

Send for descriptive folder

THE K-W IGNITION CO.

2835 Chester Avenue
We also make the famous K-W Master Vibrator
The Standard by Which All Others Are Judged

KOEHLER COMMERCIAL CAR
CARRYING CAPACITY 1600 LBS. PRICE \$750.

A Money Maker For All

Both Merchants and Agents have a splendid opportunity.

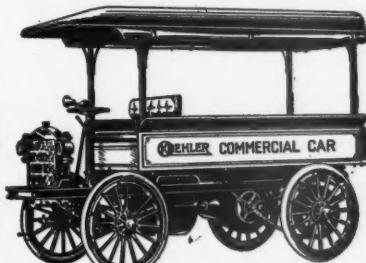
The Merchant—to increase his delivery capacity and cut down delivery cost.

The Agent—to increase his income through the sale of KOEHLER COMMERCIAL CARS.

The sturdy KOEHLER has proven its worth. It has saved many merchants many dollars. It is light, but strong and durable—a good sound motor driven commercial car. Easily managed by the novice and practically fool-proof.

Specifications

Motor—24 horse power, 2 cylinder, water-cooled. Transmission—planetary type; all gears of chrome nickel steel running in constant oil bath. Wheels—36 inch, equipped with 2½ inch solid tires on demountable rims. Equipped with Bosch magneto and Schebler carburetor.



Write at once for full particulars
S. G. CO., 1709 Broadway,
New York, N. Y.

H. J. KOEHLER

Neither
Rain, Mud
Nor Dust
Can Harm

your luggage when it is
carried in the new rain-proof, water-proof

Kamlee Auto Trunk

"Made by Trunk Makers Who Are Motorists"

Embodyes every desirable feature—strength, lightness, durability, beauty. It adds to rather than detracts from the appearance of any car.

Consider these exclusive Kamlee features before you buy an auto trunk, then you'll surely select a Kamlee: patent drop front—no lifting of lid—patent inter-locking edge makes it air-tight, dust-proof, rain-proof; no straps to bother with in opening; fitted with standard suit-cases permitting removal of one party's luggage without disturbing others.

Ask Your Dealer or write us for price and descriptive circular. If your dealer can't supply you, we'll gladly ship you a Kamlee on approval.

THE KAMLEE CO.
234 Broadway, Milwaukee, Wis.

Look for the Red and
Gold Diamond
Inlaid Right on
Front Cover

When Writing to Advertisers, Please Mention Motor Age.



Get rid of those
bad-smelling, old-
fashioned oil
lamps. Every time
you want to light
your oil lamps you
have to get out of your car.

You can light all lamps right from
the seat when your car is equipped with

J-M MOBILITE ELECTRIC LAMPS

These lamps cost about one-third as much to install and only one-third as much to operate as standard electric equipment. They can be easily and quickly installed. Will burn from 300 to 420 hours on six No. 8 J-M Dry Batteries.

J-M Mobilite Lamps consist of a vulcanized rubber socket fitted with a special Tungsten bulb, and a powerful lens and reflector. Used for dash lights, tail lights, speedometer lights, and interior car illumination. Also for motor boats, camps, etc.

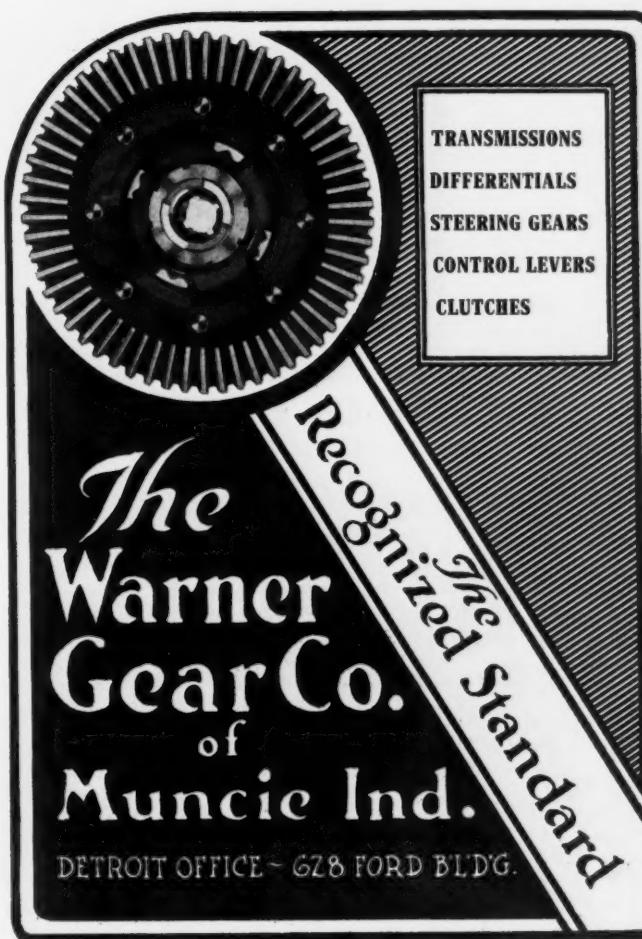
Price \$3.00 each, including necessary wire. Order from our nearest branch if not at your dealer's.

Write for Booklet

H. W. JOHNS-MANVILLE CO.

Albany	Cincinnati	Kansas City	New Orleans	San Francisco
Baltimore	Cleveland	Los Angeles	New York	Seattle
Boston	Dallas	Louisville	Omaha	St. Louis
Buffalo	Detroit	Milwaukee	Philadelphia	Syracuse
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THE CANADIAN H. W. JOHNS-MANVILLE CO., LIMITED.
Toronto, Montreal, Winnipeg, Vancouver.



TRANSMISSIONS
DIFFERENTIALS
STEERING GEARS
CONTROL LEVERS
CLUTCHES

The Warner Gear Co. of Muncie Ind.
DETROIT OFFICE - 628 FORD BLDG.

The Warner Gear Co. of Muncie Ind.

LOZIER

"The Choice of
Men Who Know"

"SIX"

\$3250

A big, roomy, completely equipped "Six" which will satisfy the man who wants the highest class, most distinguished looking motor car obtainable.

Lozier Motor Company, Detroit

"FOUR"

\$2100. Delivers Jan. 1, 1914
A true Lozier in every detail, 7 passengers, Gray and Davis Electric Starting and Lighting. Completely equipped. Meets the want of the thousands of motorists who have always longed to own a Lozier, but who have been prevented by the cost.

MIRROROID METALIZED GLASS BRONZE

will help to keep your engine in tip-top shape. It is a metallic paint that gives a smooth yet high gloss to anything that it covers.

MIRROROID will stand the highest heat of any motor without burning off or losing its lustre. In fact, it will stand a heat of 220°.

MIRROROID is absolutely the best protection on the market for engines, radiators, fans, etc. Can be had in gold, silver, aluminum and copper.

PRICES { One-half Pint..... 90c One Quart..... \$2.00

One Pint..... \$1.25 One Gallon \$7.00

Try a can TODAY. Sent prepaid upon receipt of price.

THE J. H. GENTER CO., Inc.

NEWBURGH, NEW YORK

Dealers: Keep MIRROROID in stock. It sells easily and leaves a mighty good profit. Get our dealers' offer now.

NARCO
TIRE CUT FILLER
Heals Tire Cuts
The Motorist's Self-Vulcanizer
Fills the cuts and holes, solidifies quickly and becomes like a part of the tire. Easy to use—clean cut, fill with Narco T. C. F., allow to stand over night. Result—A new tire. \$1 the tube; in Canada, \$1.50.
National Rubber Company
4411 Papin St.
St. Louis, Mo.

Warner Auto-Meter

MAGNETIC PRINCIPLE

95% of all the speedometers to be made during 1913 will be built on the magnetic principle.

Warner Auto-Meter Factory, Beloit, Wis.

Address Dept. 1

Branches in all principal cities
all over the world

Any Kind
Every Kind
Stock, or
to Blue Print

Rims

Clincher
Q. D.
Demountable
Channels

For Automobiles, Motor Trucks,
Aeroplanes, Motorcycles, Bicycles

We Also Make Axles and Hubs.

MOTT WHEEL WORKS, Utica, N. Y.

R. B. ABBOTT SALES CO., Sales Agents, Detroit

Essenkay
"ENDS TIRE TROUBLES"

Stop That Headlight Glare

Common courtesy to your fellow motorists demands that you frost your head lights while driving in the city.

You know what it means to have the glare from an automobile head light thrown in your eyes if you are driving over the city streets or parks. Essenkay Glasfrost stops the glare.

Essenkay Glasfrost is a liquid and is simply poured on the inside of the glass.

It is not affected by heat, cold or moisture and it gives the appearance of ground glass—it stops the glare and yet gives you light to see the road.

It can be taken off with alcohol when you get ready for your country trip.

If your dealer cannot supply you, send us 50c for a 2 oz. bottle (enough for eight lamps) and we will fill your order direct.

THE ESENKAY PRODUCTS CO., 1127 W. 37th St., Chicago

Winston
IGNITION
DEVICES

High and low tension magnetos, make-and-break coils, dash coils, box coils, motorcycle coils, switches, spark plugs and other ignition specialties. Guaranteed satisfaction.

WRITE FOR CATALOG

KOKOMO ELECTRIC COMPANY, Kokomo, Ind.

When Writing to Advertisers, Please Mention Motor Age.

Guide

DEALERS' PROPOSITION

Tells you how you can increase your profits handling the Guide line. Write for it.

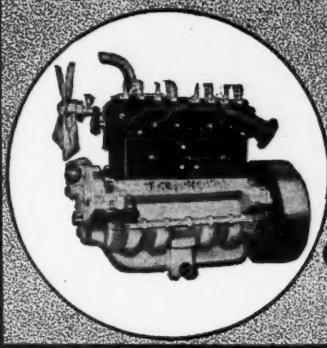
THE GUIDE MOTOR LAMP MFG. CO.
East 4th Street Cleveland, Ohio (35)

1914 *Marion* 1914

SEND to us today for advance folders which tell all about the big, new six-cylinder MARION. See the advertisements in all trade papers; wire us about our unusual dealers' contract for 1914.

THE MARION MOTOR CAR CO.
902 Oliver Avenue, INDIANAPOLIS

Continental Motors



A WORLD
STANDARD
FOR QUALITY
AND SERVICE

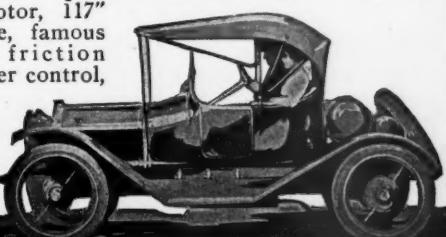
Continental Motor
Mfg. Co.
DETROIT MICH.

Ch **LAMBERT**

at the head of its price class. Rutenber motor, 117" wheelbase, famous LAMBERT friction drive, one lever control, etc. Write for catalog.

BUCKEYE MFG. CO.
ANDERSON, IND.

MODEL 99 2 PASS.
ROADSTER



The LAMBERT Model 99 (5-passenger touring car or 2-passenger roadster) at \$1365 (fully equipped) stands



Diamond
SAFETY TREAD
(Squegee) TIRES
Won't Slip - Won't Slide
Won't Skid - They Grip!

THE DIAMOND RUBBER CO. OF N. Y.
Subsidiary of The B. F. Goodrich Co.
Akron, Ohio

When Writing to Advertisers, Please Mention Motor Age.

PATHFINDER

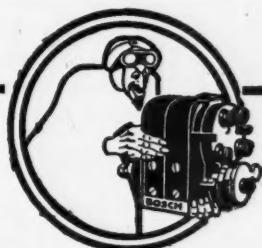
WORTHY OF THE NAME

THE PATHFINDER car is an unusual combination of mechanical virtues. Each detail is standard in design, workmanship, and quality materials.

The Pathfinder chassis is a composite of the best proven ideas in European and American practice — built to withstand rough usage and to remain quiet even in "old age." The Pathfinder "selling plan" is one you will be glad to know about. It is unique and comes to you in the form of the "101 Reasons," a short, concise course in Pathfinder salesmanship. Yes, it is absolutely different—better write today, NOW!

Just ask for—
"Photo Story of a Pathfinder"
"100 and 1 Reasons"

THE MOTOR CAR MFG. CO.
Indianapolis, U. S. A.



BOSCH

Also Won in the Santa Monica Race
Bosch Magneto Co., 214 W. 46th St., N. Y.

NEWTONE MOTOR HORNS

The name "Newtone" when connected with a Motor Horn ensures reliability, durability and absolute efficiency.



Torpedo Type
Price \$20

Automobile Supply
Mfg. Co.
220 Taaffe Place, Brooklyn, N. Y.

Get acquainted with the
standardized "Cole"

the car that is writing gasoline history.
Learn what the

**Cole franchise for
dealers**

will mean to you if you happen to be
located in open territory.



Cole Motor Car Co. of Indianapolis

Reo the Fifth

Final and crowning achievement of R. E. Olds, pioneer designer of autos. A standard size 30 to 35 horsepower four-cylinder car of modern refinements priced at only \$1095.

R. M. OWEN & CO., General Sales Agents
REO MOTOR CAR CO., LANSING, MICH.

SPLITDORF

"Always There"

The SPLITDORF "T S" TRANSFORMER is interchangeable with any type tube or dash coil and can be attached to any car. We will make a very liberal allowance on an old coil in exchange for one of the new style.

Write TO-DAY for particulars

SPLITDORF ELECTRICAL CO.
98 Warren Street, Newark, N. J.

PENNSYLVANIA
Oilproof
VACUUM CUP TIRES

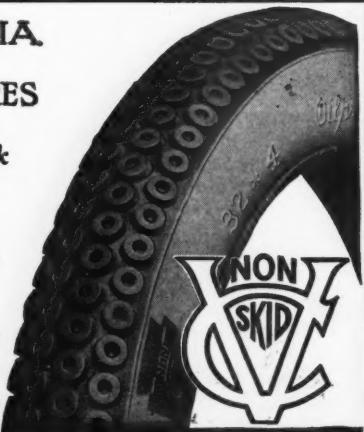
Making Their Mark
Everywhere

Pennsylvania Rubber
Company

Jeanette

Pa.

An independent company with
an independent selling policy



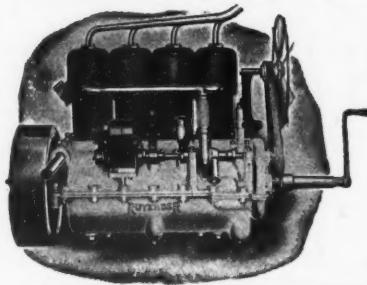
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THE RUTENBER MOTOR

MANUFACTURED SINCE 1901 FOR HIGH GRADE
AUTOMOBILES and TRUCKS

$3\frac{1}{4} \times 5\frac{1}{4}$ four and six cyl.
 $4\frac{1}{4} \times 5\frac{1}{4}$ four and six cyl.
Standard or Unit
and
 4×4 , $4\frac{1}{2} \times 5$ and $4\frac{1}{2} \times 5$
Standard Types. All L
Head 4 Cycle.

Manufacturers are invited
to investigate our service
and our facilities. Litera-
ture on request.



The Rutenber
Motor Company
Marion, Indiana



Dorris
Built to last

THE SILENT CAR
BUILT TO LAST

Our agency proposition will
interest you. Write for it.

DORRIS MOTOR CAR COMPANY
100 S. Sarah Street
St. Louis, Mo.

W
A
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We Specialize in High-grade
Automobile Parts

Transmissions
Steering Gears
Gear Shift Levers
Differentials
Electric Starters

The Warner Manufacturing Co.
TOLEDO, O.

T
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WARD-LEONARD
SYSTEM

Faultless Lighting
Infallible Starting

WARD LEONARD ELECTRIC CO.
BRONXVILLE N.Y.

Lighting - Starting



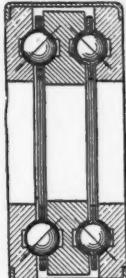
THE THOROUGHBRED CAR

*Electric Self-cranking. Electrically Lighted
Four Forward Speeds*

"Six Thirty-six" Touring Car and Roadster, \$1850
Model 30 Touring Car, \$1350 Model 30 Roadster, \$1250

LIVE WIRE DEALERS
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HERRESHOFF MOTOR COMPANY
Detroit, Michigan, U. S. A.



SUSPENSION BALL BEARINGS

The arrows on the cross section show how the load is evenly carried by upper as well as lower balls, making the only perfectly balanced radial bearing, and at the same time an ideal thrust bearing. This Double Row Ball Bearing will carry a greater load than any other ball bearing.

Races made from solid, special analysis steel. Specially selected alloy steel balls. Maximum size and greatest number of balls. Greatest bearing surface between race and balls. Closest limits of guaranteed accuracy.

Now used in motor cars, machinery, and to equip our Special Shaft Hangers. We also make plain and grooved thrust bearings.

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THE COAST LINE TO MACKINAC

THE CHARMS OF OUR SUMMER SEAS

Spend your vacation on the Great Lakes
WHERE YOU CAN GO—Daily service is operated between Detroit and Cleveland, Detroit and Buffalo; between Toledo and Saturday evening between Toledo, Detroit, Mackinac Island and way ports. 10 day stopover allowed at Alpena; either direction on tourist tickets without additional cost. Daily service between Toledo, Cleveland and Put-in-Bay. During July and August, two boats out of Cleveland and Detroit, every Saturday and Sunday night.

A Cleveland-Mackinac special steamer will be operated two trips weekly from June 15th to September 10th, stopping only at Detroit every trip and Goderich, Ont., every Monday up-bound and Saturday down-bound. Mackinac Island is also on Sunday. Special Bay Trips Between Detroit and Cleveland, during July and August.

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NAVIGATION CO.



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Means

MORE POWER! LESS FUEL

Save on your gasoline bills—develop the power needed on the up-grade—by utilizing the explosive force of all the gases in the cylinder through the simultaneous ignition of two opposed sparks. The

SUPERIOR Double Ignition SPARK PLUG
accomplishes this in a new and effective way without the use of costly, complicated mechanism. Works in connection with any ordinary plug. Readily attached to any type of gasoline motor. Send for Descriptive Pamphlet.

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*Fitted With HOUK Quick
Detachable Rims*

Make for greater resiliency, smoother riding. Save tires. Are quickly and easily removed. Practically indestructible. Absolutely rust-proof. Now being manufactured in America by the Standard Roller Bearing Company, of Philadelphia.

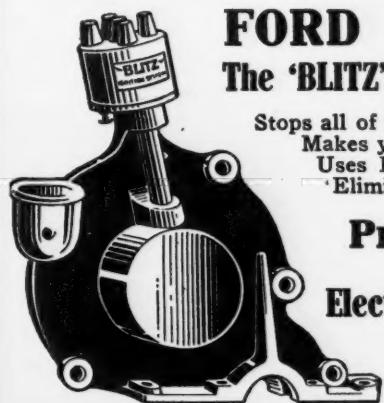
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Stops all of your ignition troubles.
Makes your car more efficient.
Uses Ford magneto current.
Eliminates the back kick.

Price \$20.00

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Fully
Equipped
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has four times the wearing service of the ordinary non-skid. Users will tell you that they have run Swinehart Keaton Non-Skid Tread Tires a whole season without having them lose their anti-skid effectiveness. Call at any one of our stores and investigate them. We also make a complete line of Smooth Pneumatic Tires of best quality. Branches and distributing agencies in all leading cities.

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Cross-Rolled Steel in Springs Cuts Up-Keep

In this new process, the steel is worked both longitudinally and transversely. So we get superior strength and toughness. We use this process exclusively in our Chrome-Vanadium Brand of Springs.

Find out more about them. It will make a tremendous difference in the riding qualities of your car.

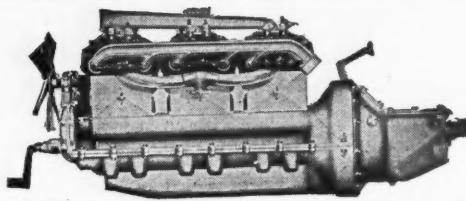
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In five years not one Cleveland - Canton Chrome - Vanadium spring returned because of breakage or settling.

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Beaver "Sixes" offer the following 1914 features: long stroke (8 1/2 x 5); just right power, 45 H. P.; 3-point suspension; large valves with enclosed action; enclosed fly wheel; 8-speed transmission; noiseless, vibrationless, oil and dust tight action; arrangement for installation of any make Electric Starting and Lighting System. Write for catalog and prices.

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Made by Bridgeport Brass Co.

Means Tire Economy

You will get more mileage and better service if you use the Stapley. It is a compound pump, has seamless brass tube cylinders and non-leakable joints. Inflates your tires quickly and easily. Everything about the Stapley up to the Bridgeport Brass Co. Standard of Quality.

Price Without Gauge
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IDEAL STEEL WHEEL (RESILIENT)

STRENGTH COMFORT BEAUTY ECONOMY

IT'S IN THE SPOKES

Makes possible the use of airless tires without sacrifice of easy riding.

Doubles the life of any set of tires.

Increases life of motor and adds to the mileage per gallon of gasoline or per charge of electricity.

Makes any car ride like a cradle.

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Write for our agency proposition.

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Model "36" \$1275.00

A car whose design and construction is so far ahead of others at its price that it is in a class all its own.

Gray aluminum Electric starting and lighting equipment, silent chain cam shaft drive, 1/2 inch by five inch motor, cork insert multiple disc clutch, 11 1/2 inch wheel base, left side drive, center control, and equipment complete to the last detail.

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Electric Starting and Lighting System \$75.00 Extra

This model has made the Paige reputation. Such a sturdy, powerful comfortable car has never been offered the public at anywhere near its price. \$950.00 with complete equipment.

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Can
Walk
From
There
to
Any-
where.



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Our new addition is ready for occupancy. We now have 360 rooms with 265 baths. Write us for descriptive folder with typical floor plan and rate card. Wire for reservation at our expense.

Rates

From \$2.50 to \$4.00 Per Day

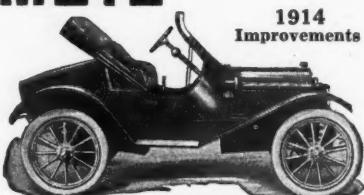
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Also The Berwick, Rutland, Vt.

METZ "Twenty-Two" Roadster

THE GEARLESS CAR

"No clutch to slip—no gears to strip."



1914
Improvements

\$475

Completely Equipped

Center control, left-hand drive, 4-cylinder 22 1/2 H. P. water cooled motor, Bosch magneto, standard artillery wheels, best quality clincher tires, extension top, windshield, five lamps, gas generator, tools, etc. Makes 5 to 50 miles per hour on the high speed, 28 to 32 miles on 1 gal. of gasoline, climbs hills as fast as ANY stock car made. A strong, reliable, stylish, fully guaranteed car. You can secure EXCLUSIVE SALE in your territory. Write at once for Book "K" and particulars.

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McCUE WIRE WHEELS

Add a Big Percentage
of Tire Mileage

Strong, Resilient, Indestructible

These wheels are equipped with **S** Standard Spokes, made by the Standard Company of Torrington, Conn.

THE McCUE COMPANY
Buffalo New York

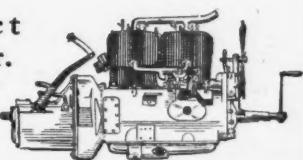
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Ergon Motors are "work" motors. Their Simplicity of design assures long life and ample power.

We never over contract our ability to deliver.

Three models. Model C, 3 3/4 x 4 1/2; model CX, 4 x 4 1/2; model D, 4 3/8 x 6.

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HERZ PLUG

"Bougie Mercedes" One great point of overwhelming superiority in HERZ PLUGS is the unbreakable Double-Stone Insulation, which replaces the porcelain of ordinary plugs. The inner stone is ground into the steel fitting, without packing. The outer stone is Blue Enamelled, a feature by which HERZ PLUGS can readily be recognized. Other important Herz features are the Four Sparking Points, the Platinum-alloy Electrode, and the self-cleaning construction. Every Herz Plug is

Guaranteed a Full Year

HERZ & CO., 295 Lafayette St., N.Y.
Makers of the HERZ MAGNETO



Steady Running Engines

result when using

Western Electric PITTSFIELD Spark Coils

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DURNO STARTER

Compressed Air — Kellogg Pump — No air in engine cylinders — No distributor to wear — No check valves to carbonize. Starts Motor From Outside. Fits any car.



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Largest Car Easily

No Heavy Battery — No wires — No expense to maintain — Easy to install — Easy to understand — Saves time, money and disposition. Air for Tires. Two years' guarantee.

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Wisconsin Motors

CONSISTENT

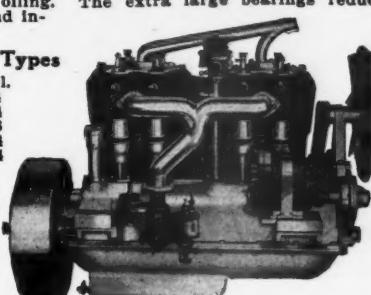
The crank shaft is of large diameter—a self-contained oiling system supplied by a gear pump through the hollow crank shaft provides perfect oiling. The extra large bearings reduce friction to a minimum and increase durability.

All 4 Cycle — In Five Types

Bore.	Stroke	Cyl.
3 1/2"	5"	4
4 1/2"	5"	4
4 1/2"	5"	6
4 1/2"	5 1/2"	4
5 1/2"	7"	4

Wisconsin Motor
Manufacturing Co.

Dept. 25,
Milwaukee,
Wis.

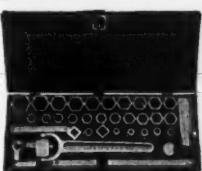


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Nothing spared to make it the best.
Price no higher than for inferior sets.

No. 1 Set
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Fits any nut or
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Satisfaction
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Let us show you why.

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When you buy SCHAFFER BALL BEARINGS you are not experimenting because SCHAFFER BALL BEARINGS have for years been recognized as the standard of bearing quality. They are made in Germany of the best steel, and are now in universal use throughout the world.

BARTHEL & DALY

42 BROADWAY

NEW YORK

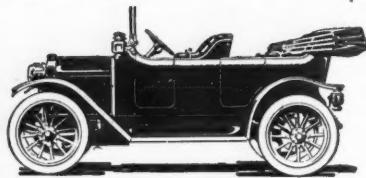
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The Detroiter—\$850 **FULLY EQUIPPED**

Five
Passenger
Touring
Car



25 H. P.
Long
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Motor

Enclosed Valves, Three Point Suspension, Unit Power Plant, Platform Rear Springs, Full Floating Rear Axle, Left Hand Drive, Center Control, Drop Frame, Large Tires, Complete Ball Bearing Car

BRIGGS-DETROITER COMPANY, 455 HOLBROOK AVE., DETROIT, MICH.
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Quality Counts

in automobile tires as it does nowhere else. We build Republic tires on the *quality* basis from the ground up. This is why you will find Republic Tires on the cars of men who know real tire values.

The Republic Rubber Company, Youngstown, O.
BRANCHES AND AGENCIES IN THE PRINCIPAL CITIES

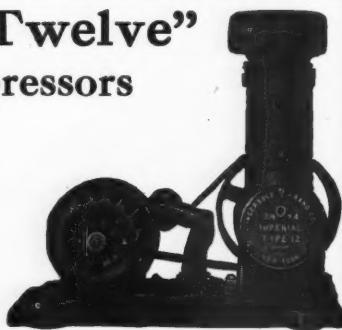
REPUBLIC STAGGARD TREAD TIRES

Republic Staggard Tread, Pat. Sept. 15-22, 1908

"Imperial Twelve" Garage Compressors

A high-class car equipment deserves high-class garage equipment. The quality of these little compressors is such as to appeal to the most discriminating buyers.

Booklet 608



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THE GOOD KIND



TYPE A

When next you are needing automobile springs, we ask you to consider the Vulcan—a thoroughly good spring.

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Buick	Flanders	Oakland
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The *Pilot* "THE CAR AHEAD"

Three Great Models: Pilot 40—Four cylinders, 4½x5; brake test, 58 horse-power; 120" wheel base; price, \$2000. Pilot 50—Four cylinders, 4½x6; brake test, 59 horse-power; 126" wheel base; price, \$2250. Pilot 60—Six cylinder, 4x6; brake test, 67 horse-power; 132" wheel base; price, \$2500.

The Car Without a Mechanical Defect

Teeter "T" head motors, full floating rear axles, Brown-Lipe differential, Warner transmission, Eisemann magneto, Stromberg carburetor, handsome jewel bodies with ventilating windshield. Completely equipped, with every convenience and comfort. Dynamo electric lighting and electric starter (Gray & Davis system), power tire pump. We have the greatest agency proposition in the United States.

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A Solar Lamp for every motor need.

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Standardized Transmissions

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Covert Motor
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ZENITH
Gives Standard Carburetion
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JOSEPH DIXON CRUCIBLE CO.
Established 1827

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(Manufactured Under a Basic Patent)



Price, \$3.50

Repairer attached to spring broken in center at spring bolt—a common occurrence. Taken in time by attaching Spring Repairer there need be no cause for alarm. May be placed in other positions wherever springs are broken.

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You do not have to depend upon a season sale
—you can have year 'round sales and satisfied customers if you handle



Our agency proposition is unusually attractive. Hearty co-operation; local advertising as well as the national campaign now running; a high-grade car backed by a sound company. Write today for sample contracts and discounts.

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All models F. O. B. Detroit. Fully equipped
Literature sent upon request

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Over 65,000 in use on 1913 cars
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It is instantly responsive and eliminates constant care and adjustment.

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THE DEAN ELECTRIC COMPANY
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"Look for Elyria-Dean where Quality's seen."



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Newest Designs; Latest Improvements; Built in every detail to insure satisfactory and permanent results.

Write for photographs, descriptive literature and the exceptional values we offer you—far beyond all others.

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Exclusive Motor Truck Builders
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Found only
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THE AMERICAN BALL-BEARING CO.,
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Spark Plug

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Why not be a pioneer in your territory?

The reason is apparent—none better at any price. Made in all standard threads mailed upon receipt of price.

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Torrington, Conn.

50¢

HERCULES—"The Auto Lock That Lox"

The large amount of money invested in your car demands at least a small amount invested in its protection. \$7.00 is all a HERCULES costs—cheap insurance with no premium. The HERCULES is screwed into the gear shift lever with hardened screws and locked when this lever is in neutral. You cannot move your car except by hand even though you have a self-starter.

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Neat and compact. Automatic in action and always attached. Fits nearly all cars using 3 or 4 speed selective type transmission.

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At all dealers or direct on receipt of price

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Choice Territory Open

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Nordyke & Marmon Company
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Six-cylinder, 48-80 h. p., 145-inch wheel base with short turning ability, eliminating the old objections to long wheel base. Body types and equipment to meet every requirement. The only big car with small car advantages. Wonderful riding qualities and surpassing power and flexibility. A car developed by years of exacting tests. Price, \$5,000.

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For
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HYATT ROLLER BEARING CO. Works Newark, N. J.

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Your Motor Car!



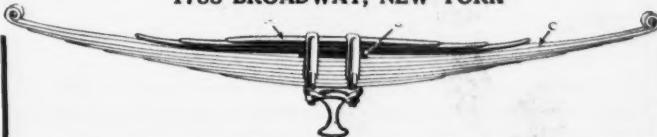
Electric Starter
Electric Lights
Center Control
Complete Equipment

Nyberg SIX \$2000
FOUR \$1650

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The Ames Automatic Shock Absorber
founded on logic, developed by science, maintained by its simplicity and sold by wise dealers on its positive merit.

The
AMES
AUTOMATIC
SHOCK ABSORBER
Clarence N. Peacock & Co. Exclusive Licensees
1788 BROADWAY, NEW YORK

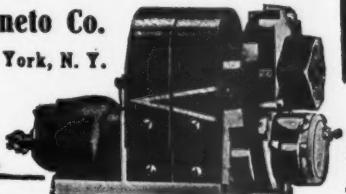


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Automatic Spark Control

Quality—not only as to efficiency and manufacture, but in design as well—characterizes all Eisemann Ignition systems. Not only do they insure hot fat sparks at all speeds—but they are simple, accessible and fool proof.

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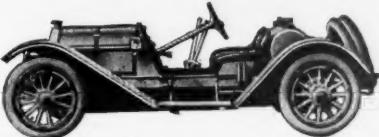
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\$5000 in Cash Prizes

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Type 35
Series J
Race-about



Guaranteed Speed
—Mile in
51 Seconds

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The Mercer's speed and endurance record at Indianapolis and other important contests is a valuable asset from the dealer's viewpoint.

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You can take a thousand miles of service out of a set of tires by driving them insufficiently inflated over ten miles of road.

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Costs more than other lubricants for bearings and gears but its use reveals true Economy in dollars saved on repairs and in Efficiency retained in your car.

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The Kentucky Thoroughbred Ames **45**

With Electric Self-Starter. An Electric Starter of proved efficiency is one of the features of the Ames "45"—a car with every essential refinement contributing to comfort, yet priced at \$1,785. Without Starter, electric lighted \$1,635. Made with well-known "Amesbilt" body, 5-passenger, motor-driven electric lights. Perfect cooling system. Force-feed pump. Schebler Carburetor, new Remy dual system high tension magneto, oil-driven pumps. Sight-feed. Warner multiple disc, Raybestos-lined clutch. Selective transmission, 3 speeds forward and reverse. Stewart speedometer. Best mohair top, side curtains, boot. 36x4-inch tires. Powerful, speedy—comfortable—unequalled at price. Write for catalog.

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Owensboro, Ky.

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Bull Dog
Non-Skid

Braender Tires & Tubes

Are of the highest quality
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They are built to last.
Ask any user.

ESTABLISHED AGENTS SOLICITED

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6 Cylinder, Left-hand Drive
Center Control
132-inch Wheel Base

INTER-STATE AUTOMOBILE CO.
MUNCIE, INDIANA

KRUPP STEEL

IS NO EXPERIMENT. It is the best that brains and years of experience can produce. Manufactured in various grades for all motor car parts. Round forged bars of chrome nickel steel, grade E F 50.8, carried in stock in New York City.

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"THE TUGBOAT OF LAND COMMERCE"

SOLVES THE
HEAVY TRUCKING
PROBLEM



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write for our booklet giving facts about road tests, prices, testimonials, and our 1913 proposition.

DOUBLE FABRIC TIRE CO.
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The Emblem of Efficiency

Chase Motor Trucks

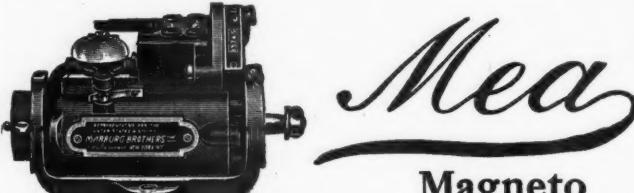
It is natural that the manufacturer who persistently builds towards an ideal should succeed in his share of the world's work. We sold more light delivery trucks last year than any other manufacturer in the country. Our working ideal is service.

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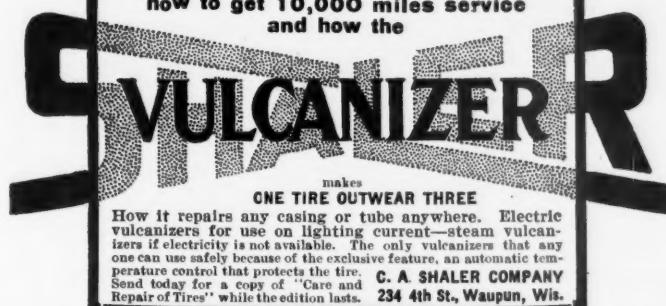
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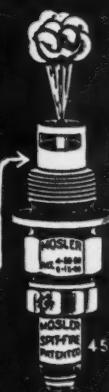
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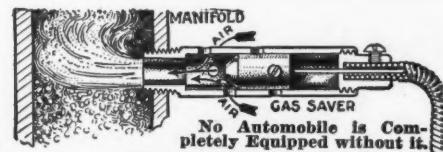
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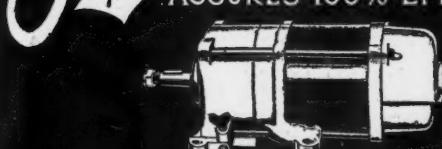
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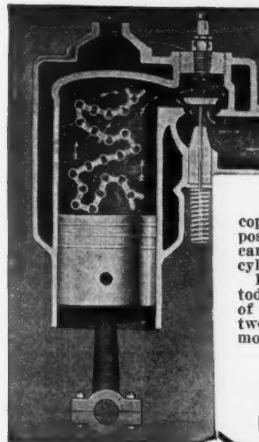
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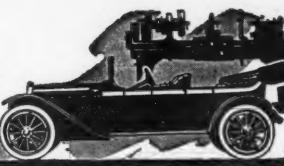
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LOZIER 1911 FOUR-CYLINDER BRIAR- cliff; A1 condition. Electric lights; good tires carried at the rear. Rocky Mountain radiator and extra large fan. Equipment complete in every detail. Removable tonneau making a fast powerful roadster. Nothing can trim you with this car. Will go anywhere as fast or as slow as you want to ride. No trades, cash only. C. L. Newcomb, Jr., 768 Franklin Street, Denver, Colo.

MITCHELLS, REBUILT, GUARANTEED.
These cars are fully equipped. Call or write for further particulars.

Mitchell Automobile Co.,
2334-36-38 Michigan Ave., Chicago.

NEVER BUY AN AUTOMOBILE UNTIL you know the material used, the good points, the objectionable parts. Send for free copy: "Foresight in Buying." Dept. K, Professional Information Association, Hartford, Conn.

SECOND-HAND CARS FOR SALE
Complete descriptions of different makes of cars with owners addresses sent for \$1. Deal direct with owners, save commissions. Satisfaction guaranteed or money refunded. The Peoples Exchange, Marengo, Ill.

SELDEN, 1912, 5 PASSENGER, FULLY equipped, demountable rims, with extra tire and rim. Up-to-date in every way. A good buy for someone wishing a good car at a low price. Condon, 2635 Wabash Ave., Chicago.

TO CLOSE AN ESTATE WILL SACRIFICE
1912 Marion Roadster, center control, guaranteed A No. 1 condition. Trenton House Garage, Trenton, N. J.

UNDERSLUNG ROADSTER, SIXTY HORSE power; four speeds; 136-inch wheel base, 40x4½ tires; floating axle, imported bearings, complete with electric system; run hundred miles; worth three thousand—quick sale \$775.00. Address W. S. Reed, Martinsburg, West Virginia.

1912 DETROITER FIVE-PASSENGER touring car, in excellent condition, for \$500 cash; all tires good, Prest-O-Lite, top and complete outfit of tools. J. O. Maland, Frost, Minn.

1913 LOZIER 7-PASSENGER BIG SIX with self-starter and full equipment. Car is practically brand new and has new tires all around. Price \$3,600.

ARCHAMBAULT MOTOR SALES CO.,
197 Ogden Ave., Milwaukee, Wis.

"30-60" 5 PASSENGER STEARNS, JUST overhauled and repainted, new tires, demountable rims, with new extra tires. This is a snap for some one wishing a high-powered car at a bargain. Condon, 2635 Wabash Ave., Chicago.

Parts and Accessories FOR SALE

A BARGAIN; STORAGE BATTERIES, 6-80 and 6-160; guaranteed; all makes, new and used, \$3.50 to \$10 for short time only. 4105-7 Cottage Grove Ave., Chicago. a

ACME REPAIR PARTS
We carry a complete stock of parts for all types of Acme cars. Can ship promptly. Adam E. Arnold, 212 S. 11th St., Reading, Pa.

ARE THESE BARGAINS?
Rajah spark plugs.....\$.75
Bosch spark plugs..... .80
Tire gauges..... .30
Soot proof plugs..... .30
2 x ¼ brake band lining asbestos, foot..... .12
Secondary cable, foot..... .04
Metzer windshields, new..... 7.00
Ford rubber mats..... .90
Screwdrivers, all sizes, hard rubber handles, friction top..... .15
Metal polish, per gallon..... .55
E. Z. Engine starters..... 4.00
Send for our clearing sale sheet. Must sell these.
Cut Price Auto & Supply Co.,
438 Rush St., Chicago.

ATTENTION, CAR OWNERS—USE OUR Q. D. Tire Remover, just turn the A Crank and the tire lugs will be off. \$1.25 prepaid. Sunvold-Larson, Sacred Heart, Minn.

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Having purchased the repair business of the Henry Motor Co., we are prepared to fill orders promptly for repairs for Henry cars. Muskegon Automobile Co., Muskegon, Mich.

AUTOMOBILE REPAIR AND MACHINE shops should send for our catalogue of W. B. Phosphor Bronze Bushings; 350 stock sizes listed. Wm. B. Anderson Foundry Co., 24 So. Clinton St., Chicago.

AUTOMATIC SPEEDER AND PRIMER.
Every car owner should have one, saves 25% on gasoline, starts motor with first turn of crank. The most rapid selling automobile device on the market. Agents wanted. Price, \$7.50 f. o. b. Frankfort. Automatic Device Co., 551 E. Jefferson St., Frankfort, Ind.

A WHITE STEAMER GENERATOR AND burner, almost new. Will sell cheap. Address Box D 245, c/o Motor Age. w

AUTO OWNERS IN SMALL TOWNS.

You can save one-half your tire expense and nearly all your tire trouble by using Security Reliners. Many of our customers run their cars the entire season without blowout or puncture and without spending a cent for tire repairs.

YOU CAN DO IT YOURSELF.

If we have no dealer in your town you can get a trial order at the dealer's price, and make a good profit selling to your neighbors. If you run your own car write at once for our plan.

SECURITY RELINER CO.,
301 Spring St., Montgomery, N. Y.
248 W. 54th St., New York.

BALL & ROLLER BEARINGS.

All Types and Sizes.
We also repair or exchange all makes of ball bearings.
THE GWILLIAM CO., 253 W. 58th St., N. Y.
1314 Arch St., Philadelphia.

BARGAINS.

New Mohair Tops, complete with side and storm curtains suitable for Fords, Buicks and Flanders touring cars.... \$11.85
1 Gal. Brass Polish..... 40
Gas Lamps (black and nickel), 8 1/2".... 4.25
Tail Lamps (brass)..... 1.00
30x3 Inner Tubes (new)..... 2.25
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Electric Horns, complete..... 4.00
Terms cash with order. Money back if not satisfied.

Erwin Greer & Co.,
1456-64 Wabash Ave., Chicago, Ill.

BARGAINS—BARGAINS—BARGAINS

Is the only thing we handle, from a cotter pin to a complete car. Small and high-powered cars, engines, frames, bodies, axles, radiators, transmissions, magnetos, tops, etc. Before buying let us quote.

Pacific Motor Car Exchange Company,
10 West 62nd St., New York.

BARGAIN—O. B. PORTABLE AIR COMPRESSOR. Practically new; used altogether under two hours; suitable private or small public garage. Selling because discarding pneumatic tires. Box D 495, c/o Motor Age.

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BERGDOLL REPAIR PARTS. The repair business of the Bergdoll cars, together with all drawings, jigs, patterns, etc., has been purchased by us. We have a complete stock of repair parts for all models on hand and orders for parts for Bergdoll cars should be placed with us direct to save time.

Louis J. Bergdoll Motor Co.,
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CARBON—CAUSES—ENGINE TROUBLES. By removing the carbon from your cylinders you eliminate 90% of your engine troubles.

The M. H. B. CARBON REMOVER is saving thousands of motorists time and money by its use. Can be applied by any novice. Gives instant result. Acts like magic. Guaranteed to remove the carbon or money refunded. Price \$1.00 per quart prepaid. Use 2 ounces (liquid) to one gallon of oil. Dealers write for special proposition.

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COMPLETE "VULCAN PROCESS" of oxy-acetylene welding plants from \$175 for the blacksmith and garage plant up to largest made. Torch light weight. Does not backfire in ordinary work.

Write today for our booklet on welding.

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Send us \$1.00 and receive illustrated cloth bound book on practical welding.

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E.M.F., Flanders, Buick, Regal, etc. Complete outfit with brass lock open pedal, \$1.50. Lincoln Machine Shop, Lincoln, Ill.

DRAGON REPAIR PARTS.

We manufacture and keep on hand all repair parts of the Dragon cars. We make a specialty of repairing this machine. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

FORD CAR WIRE WHEELS

Demountable wire wheels, interchangeable all around, built especially for Ford cars. Five wheels to a set, enabling you to carry spare wheel with inflated tire and make quick change.

THE F. & H. WIRE WHEEL CO.,
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FORD OWNERS—WE CAN MAKE YOUR car the easiest rider made with light or heavy load; no jolt, no jars, no upthrust. Write us. Thomas Auxiliary Spring Co., Canisteo, N. Y.

FORD FAN BELTS, WOVEN COTTON AND silk; outlasts six regular belts. Postpaid, 60c. Dealers, write. Angier's, Streator, Ill.

FORD GASOLINE TANKS \$2.00 each f. o. b. Toledo, same as used in 1913 Fords. MacINNIS BROS., 120 22nd St., Toledo, O.

FORD LIGHTING OUTFITS \$5.50. Includes parabolic reflectors, tungsten bulbs, wiring switch and free delivery. Truscott Auto Supply Co., St. Joseph, Mich.

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You will save trouble and money by installing our timer elevating device. Ford Parts Specialty Co., 1211 Main St., Richmond, Ind.

FORD OWNERS—OUR SPARE DEMOUNTABLE wheel cures tire trouble on road. Doctors, attention. Write Angier's, Streator, Ill.

FORD OWNERS: THE BLACKBURN Autolock Switch offers you Certain-Teed Theft Insurance. Yale key for plug. Price \$5.00. Money-Back Guarantee. At your dealer or Blackburn Specialty Co., 1134 Prospect Ave., Cleveland, Ohio.

FORD, HUPP AND MAXWELL Muffler cut-out, machined ready to attach, including lock open pedal string and cables, \$1.35. Lincoln Machine Shop, Lincoln, Ill. c

FORD T. OWNERS. Foot throttle or accelerators, \$1.50. Lincoln Machine Shop, Lincoln, Ill. c

FORE-DOORS AT CUT PRICES.

Mr. Auto Owner and Dealer: If your car is without fore-doors, write today for bargain prices; to reduce stock.

DEPT. D., AUTO SPECIALTY MFG. CO.,
326-30 E. Market St.,
Indianapolis, Ind.

FOR SALE
1 60-H. P. Thomas motor, \$100
1 35-H. P. Northway motor, \$125
Pope-Toledo parts for sale.
Auto Salvage Co.,
1436 Wabash Ave., Chicago.

FOR SALE—COMPLETE CHARGING REC-TINER for electric automobiles, together with automatic shutoff. Apply Oscar Greenwald, care Gimbel's, Milwaukee, Wis.

FOR SALE—VELVET AUXILIARY springs, 150 pairs; entire lot or in small quantities, while they last, at a very reasonable price. Don't miss this bargain—write quick. Stutz Motor Car Co., Desk A-2, Indianapolis, Ind.

FOR SALE—100 NEW 4-CYLINDER 5"x8" governor controlled heavy duty motors, suitable for truck or light tractor purposes. In lots to suit purchaser. Not heavy enough for our work. Must be sold at once. Will sell at a sacrifice. 570 Prior Avenue, St. Paul, Minn.

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RADIATORS FOR REPLACEMENT.
Built for any car made. Prompt shipment. Get our prices.
SPECIALS THIS MONTH:
Buick 17—\$34.00 Velle 30—\$30.00
Hudson 20—\$32.00 Hupmobile 32—\$30.00
WRIGHT COOLER & HOOD CO.,
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GOULD \$50.00 AIR COMPRESSORS FOR \$18.00. Ford outfit \$4.00 complete. Fred Allen Automobile Supply Co., 1610 S. Michigan Ave., Chicago, Ill.

GUARANTEED FORD SPECIALTIES Reg. Pr. Cut Pr.
Ford lighting outfit, Ediswan base, complete, with genuine
Tungsten bulb..... \$10.00 \$ 2.95
Ford Master vibrators..... 10.00 5.60
Ford Slip Seat covers, complete 20.00 10.50
Ford oil gauges..... 1.00 .19
Send for our 96-page cut price illustrated catalogue.

Liberty Tire & Supply Co.,
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GUARANTEED BATTERIES.

6 volt 140 Amperes.....	\$16.00
6 volt 80 Amperes.....	13.00
6 volt 60 Amperes.....	10.00

The Ampvo Battery Co.,
1607 Michigan Ave., Chicago, Ill.

GUARANTEED RADIATORS

For all cars. The following is our stock list of radiators for the cars mentioned, subject to immediate shipment. Compare our prices with other lists.

Ford Model "T".....	\$18.00
Buick 10-32-33-14.....	27.50
Buick F-16-17-19-26-27-28.....	35.00
Buick 38-39.....	42.50
Hudson 20.....	33.00
Chalmers F-40.....	30.00
Lion 40.....	25.00
Warren 40.....	28.50
E-M-F 30.....	30.00
Flanders 20.....	30.00
Brush A-B.....	17.00
Anhut.....	15.00
Northern C.....	32.00
Wayne 30.....	35.00
Special 40 H. P.	15.00

Terms: One-third cash with order, balance with order.

When ordering state year.

AUTO PARTS MANUFACTURING CO.
453 Trombly Avenue, Detroit, Mich.

60-H. P. THOMAS FLYER ENGINE, BOSCH mag., complete, \$125; same engine with coil \$90. Monarch 35 multiple disc clutch, dual mag., \$125. New Timken, 2 ton front axle, complete, \$35.00. Thomas Flyer and taxi parts cheap. Weaser, 3260 Rhodes Ave., Chicago, Ill.

LAMPS, BLACK AND NICKEL, \$9.50 PER pair, worth \$20.00; bodies, four-passenger, fore-door, untrimmed, \$20.00; Stapley compound foot pumps, \$2.85. Get our bulletin. Automobile Appliance Co., 1712 S. Michigan Ave., Chicago, Ill.

LION REPAIR PARTS. We have on hand a complete stock of repair parts for all models of Lion Cars. Lion Motor Parts Co., 124 N. 3rd St., Philadelphia, Pa.

LATEST FORD ROADSTER BODY, \$35. Tops, curtains included. MacInnis Bros., Toledo, O.

MR. (FORD) OWNER AND GARAGE MAN. The Townsman Valve Adjuster has a cushion for your valve-stems. Takes away the click, absolutely silencing the valves. No screws or burrs to work loose. Saves putting in new push-rods and valve-stems. They never wear out. Price \$1.50 by mail. Ask your jobber, or address Townsman Auto Specialty Co., Mitchell, S. D.

MORA REPAIR PARTS. We purchased the repair business of the Mora Company and have in stock repair parts for all models of Mora cars. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

MAGNETOS: WE HAVE 2,000 MODEL X Splitdorf Magneto, new. Price, without coil, \$17.50 each; with coil, \$25.00 each. The regular price of these is \$75.00.

We also have other makes of magnetos at cut prices, in fact, everything for the automobile. Send for "OUR PRICE WRECKER"—the greatest money saver in the world.

TIMES SQUARE AUTO CO.
1210 Michigan Blvd., Chicago, Ill.
S. W. Cor. 56th St. & Broadway, N. Y. City.

NEW 60 H. P. 1913 CONTINENTAL, T head motor, automatic governor, \$115.00; Bosch magneto, complete, \$275.00. Rutenber 50 with clutch, \$90.00. Thomas Flyer 60 with Bosch magneto, \$125.00; same with coil, \$90.00. Monarch 35, multiple disc clutch, dual magneto, \$125.00. Winton 35, \$40.00. All 4-cyl, 4 cycle, complete. Weaser, 3260 Rhodes Ave., Chicago, Ill.

OXY-ACETYLENE WELDING AND CUTTING machine. The Admiral Welding Machine is built by men who know; large capacity self-generating; portable; perfect for all classes of work. Send for booklet, "Welding and Cutting." Price, with Welding and Cutting Torches, all Filler Rods, Fluxes, Chemicals, etc., ready to begin earning big money, \$250.

We do expert welding; prices right.
Admiral Welding Machine Co.,
1331 Walnut St., Kansas City, Mo.

OUR AD IN THE CLEARING HOUSE
section will interest every live wire salesman. Just turn to page 102 and look it over, we know it will interest you. Look for the name **QUICK-KNICK**.

Forest City Sales Co., Fremont, Nebr.

OWNERS — DEALERS

Write for our bargain list on accessories, windshields, 34 x 3½ tires, models J. & H.-K. & W. magnetics, axles, Ford equipment, springs for any car manufactured in Michigan. F. & S. and N. D. ball bearings, in fact everything and anything for the automobile.

NOTICE, GARAGE OWNERS:

Write us for our special bargain list on machinery and tools.

AUTOMOBILE SUPPLY & MACHINE CO.,
718 Free Press Bldg., Detroit, Mich.

PANEL AND TRUCK BODIES
of special design particularly for the economical handling of merchandise. Ornamental bodies of exclusive style built to order; good and high-class painting. Get our estimates.

Fargo Motor Car Co.,
1164 W. 22d St., Chicago.

PELLETS MAGNETO EXCHANGE,

1463 Michigan Avenue, Chicago, Ill.
Headquarters for installing any makes of lighting and ignition systems.

RADIATORS

To order for all cars,
We use copper fins and tubes.
You can buy brass cheaper, but the cooling efficiency is not there.
Black enamel, baked finish, \$2.00 extra.
Terms cash with order, or one-third deposit with C. O. D. shipments.
\$5.00 Trade Allowance for old radiator shipped in F. O. B. Detroit.

Ford Model T.	\$22.00
Ford Model R. S. & N.	28.00
Hupmobile 1910-1911	28.00
Hupmobile 1912-13	38.00
Warren 1910-1911-1912	35.00
Packards to sample, \$50 to	65.00
E. M. F. 30.	35.00
Flanders 20	30.00
Patterson 30	35.00
Buick 10-14-32-33	30.00
Buick 16-17-19-26-27-28	35.00
Hudson 20	32.00
Hudson 33	40.00
Cadillac 30	35.00
Paige 1910-1911	28.00
Paige 1912	30.00

SPECIALS.

Electric tall lamps, complete, each	1.25
12" bullet headlights, complete, pair	12.00
1 model F Thomas radiator, cellular type	40.00
R. C. H. headlights, 8", pair	3.00
Vehicle lamps, red and white light, each	.75
Oil tall lamps, each	1.25
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Regal 30 dashboards, each	1.00
15" Barnes' drill, good as new	23.00

HURON RADIATOR & LAMP COMPANY,
253-255 Jefferson Ave., Detroit, Mich.

RADIATORS—NEW GUARANTEED GOODS

Ford, Model T.	\$16
Buick, Model 10.	22
Buick, Model F.	25
Chalmers-Detroit	20
Everett	20
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Any other make required at equally low prices.

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REAL BARGAINS IN MOTORS

Unit power plants, radiators for all standard makes of cars. Windshields, \$7. Side oil lamps, brass or black, \$2.75 pair. Gas or electric head lights, 8½ to 9 inches, \$6 per pair. \$1 spark plugs, 20c. Universal joints, steering gears and other parts for cars at bargain prices. Write today to

Nichoalds Company
424 Grand River Ave.,
Detroit, Mich.

"SAVE YOUR GASOLINE."

We have 150 Rayfield carburetors, regular \$20.00 kind. Our price, \$8.20 while they last.
PURITAN MACHINE CO.,
415 Lafayette Blvd., Detroit, Mich.

SCHEBLER MODEL "L" CARBURETORS,
new, 1½ or 1½-inch, \$8.00 each. Order early. Kent Motor Car Co., Kenosha, Wis.

REMOVAL SALE

WE ARE MAKING SPECIAL PRICES

IN OUR SUPPLIES

Prior to Moving Into Our New Building.

Electric horns	\$2.85
9" headlights B. & N., per pair	6.50
Side oil lights B. & N., per pair	3.00
Tail lights B. & N.	1.50
Rain vision windshields B. & N.	9.00

Special prices on guaranteed vulcan inner tubes.			
28x3	\$1.90	38x4	\$3.65
30x3	2.00	34x4	3.75
32x3	2.15	35x4	3.85
30x3½	2.75	36x4	3.95
31x3½	2.80	37x4	4.10
32x3½	2.85	34x4½	4.60
33x3½	3.00	35x4½	4.75
34x3½	3.05	36x4½	4.90
36x3½	3.20	37x4½	5.05
30x4	3.40	35x5	5.60
31x4	3.45	36x5	5.75
32x4	3.50	37x5	5.95

SEND FOR OUR BARGAIN SHEET.

AUTO PARTS CO.

513-31 Jackson Blvd.,

CHICAGO, ILL.

SEAT COVERS FOR ALL CARS. SPECIAL
price on Ford seat covers. We make a speciality of Ford commercial bodies.

Auto-Cape Top Co.,
2334 Michigan Ave., Chicago, Ill.

TOURING, ROADSTER, RACING BODIES.
Seats, special and stock sizes. Radiators, hoods, tanks and fenders for any car. Get our prices.

Auto Sheet Metal Works,
1534 Michigan Ave., Chicago.

TOPS BUILT, RECOVERED AND REpaired.

C. G. Meyer & Son, Tiffin, Ohio.

TRUFFAULT-HARTFORD SHOCK ABSORBERS: \$45.00 kind; \$20.00 set of four.
PURITAN MACHINE CO.,
417 Lafayette Blvd., Detroit, Mich.

UNION OXY CARBIDE CO.

Manufacturers of Portable (weight 40 lbs.) and stationary welding, cutting or lighting plants; supplies of all kinds. Agents wanted. Fulton & Enfield Sts., Brooklyn, N. Y.

WE NOW HAVE BUT A FEW 30-35 AND
35-40 H. P. motors ready for shipment. Complete with magneto, coil and clutch. F. E. Alford, Goshen, Ind.

WESTON MOTT HIGH GRADE REAR
axles, \$45.00. Other bargains, too.
PURITAN MACHINE CO.,
413 Lafayette Blvd., Detroit, Mich.

WRITE THE GUN METAL FINISH CO.
313 Powers Bld., Decatur, Ill., for free samples of ELECTRO-KNICKEL POWDER, for plating automobile trimmings. Will put on as heavy a coat of metal as an electroplating bath.

50 NEW PRESSED STEEL FRAMES 163"
long, 34" wide. Each \$10.00. Send for sketch.
Lucas & Son, Bridgeport, Conn.

\$690.00+\$3.00.

You pay \$690.00 for your Ford and take the risk of it being stolen. Crankblock costs \$3.00 and safeguards your car.
H. C. Fairchild, Mfr., Maplewood, N. J.

Cars Wanted

CAR WANTED—I OWN 100 ACRES OF
timber and mineral land in Mo. worth \$1,500 that I will trade for new touring car of '13 or '14 model of equal value. I want a car and will give a good trade if you have the car I want. B. F. Gollmar, Baraboo, Wis.

FORD CAR STOLEN
License No. 74987 Ill., car No. 165,791, engine No. B3862. Notify M. Bristle, Sheriff, Ford Co., Ill., and obtain reward of \$50.00.

SECOND-HAND CARS WANTED

Several parties wanting to buy and trade for second-hand cars. Send complete description. Do not misrepresent. No commissions asked. Be your own agent. The Peoples Exchange, Marengo, Ill.

TO TRADE FOR AN UP-TO-DATE
roadster, my equity in a smooth, level, improved 160-acre farm, five miles from this town. A. F. Dankenbring, Eagle Butte, South Dakota.

For Sale or Exchange

FOR SALE OR TRADE

A one-ton Buick truck. \$700, if taken at once.
A large 1910 5 passenger 40 H. P. Mitchell, detachable tonneau, 4-inch tires; will make fine truck and pleasure car combined, \$450. Albany Automobile Co., Albany, Wis.

**Parts and Accessories
WANTED**

WANTED — PREST-O-LITE TANKS. WE
pay the following prices:
A. Presto Tanks (large).....\$9.00
B. Presto Tanks (medium).....7.50
E. Presto Tanks (small).....6.00
Ship in any quantity C. O. D. or S. D. B. L.
ERWIN GREER & COMPANY,
1456-64 Wabash Ave., Chicago, Ill.

Situations Wanted

CAR OWNER WISHES POSITION AS
Chauffeur in private family in Southern Ohio or Indiana preferably. State salary. Address Box D 450, c/o Motor Age.

CHAUFFEUR WISHES POSITION IN
private family, good mechanic and vulcanizer, best of references, am strictly sober and reliable. Address Box D 496, c/o Motor Age.

EUROPE.

I want to connect with some good, square firm as European manager and a percent on profits. I have 12 years' experience with automobiles as practical and technical man. Am a real live salesman, organizer, manager and a tireless hustler. I can speak English, French and German. I have successfully established a German car on the English market, selling at a high figure against very keen competition. I can do the same for you. Don't go in for agencies, but establish yourselves right here on the spot and keep all the profits. Your own show in Europe is the right tack to be on. See what the Ford and Studebaker have done, and are doing, here, but, mind you, with their own branch. I can sell your goods in France, Germany and all other countries, for I know all about their ways. I am available on September 1st this year, owing to disagreement with my partners. Write quick. A. S. 4 Blandford Road, Bedford Park, London, W.

POSITION WANTED AS FOREMAN OF
automobile repair shop by first class mechanic of long experience. Desires a position that will be permanent and where good salary will be paid for faithful and efficient service. West or Northwest preferred. Address Box D 501, c/o Motor Age.

POSITION WANTED AS SALESMAN OR
demonstrator by reliable young man having four years' experience. Can give bond and furnish references. Address Box D 467, c/o Motor Age.

POSITION WANTED BY AN EXPERIENCED
mechanic and driver, with some northern owner of a high-grade automobile, as chauffeur during the summer and fall; absolutely sober and reliable; for further particulars address Box D 447, c/o Motor Age.

SALES MANAGER.

Real salesman with broad and successful retail and factory experience as sales and advertising manager desires position with progressive concern. Best of references. Address Box D 494, c/o Motor Age.

SALES OR ADVERTISING MANAGER
Position wanted as sales or advertising manager by sober, industrious, young married man of wide retail and wholesale experience in the automobile business. Can show successful record as sales and advertising manager for two large automobile factories. Never changed positions except voluntarily for personal advancement. Services available Sept. 1st. References furnished on request. Address Box D 499, c/o Motor Age.

WANTED—A POSITION AS ASSISTANT
manager in garage; have had 12 years' experience; best of references. Address Box D 475, c/o Motor Age.

WANTED—POSITION WITH SOME AUTO
firm year around by expert mechanic; also specially good on carburetor coils and magneto. Would consider job as demonstrator. F. A. Harvey, Tracy, Iowa.

Help Wanted

ENGINEERS, SUPERINTENDENTS,
Works Managers, Designers, Production and Efficiency Engineers, and Draftsmen with automobile experience. Inquiries confidential; record must stand investigation when desired. The Engineering Agency, Inc.—20th Year—Chicago.

WANTED—AN AUTOMOBILE SERVICE
Manager competent to assume entire charge of all road work of the service department, including the employing and supervising of the work of service men under him.

Address Palmer & Singer Mfg. Co., Long Island City, N. Y., or Western Branch, 2638 Michigan Ave., Chicago, Ill.

WANTED: NEAT APPEARING AUTO MECHANICS, with good references, in all small towns to make installations of automobile devices for us. Address: Halliwell Co., 408 West Pico St., Los Angeles, Calif.

WANTED—THOROUGH AND EXPERIENCED factory superintendent for assembly proposition. Must be familiar with body painting and trimming. Address, giving full particulars, references and details. Address Box D 473, c/o Motor Age.

60 HIGH GRADE MEN WANTED
For all lines of the automobile industry. The Toledo Engineering Agency, Toledo, O. H. L. Croy, M. E., Mgr. Member S. A. E.

Wanted—Agents

WANTED—A MANUFACTURER'S AGENT
who calls upon the automobile manufacturers to take on one of the very best auto parts on the market. Patent pending. Address Box D 498, c/o Motor Age.

Business Opportunities

CONTROLLING INTEREST IN TAXICAB
business in prosperous city of 50,000 may be purchased at a reasonable price; half down, balance on time. Owner has other business interests. For full particulars, address Box D 474, c/o Motor Age.

FOR SALE—A GARAGE 50x116 FEET IN town of 2,000; only garage in town; 2 car agencies; sold 45 cars so far this season; good machine shop and large accessory line; takes about \$12,000 to handle business. Owners have other business that requires their time. Address Lemmon Auto Co., Lemmon, S. Dak.

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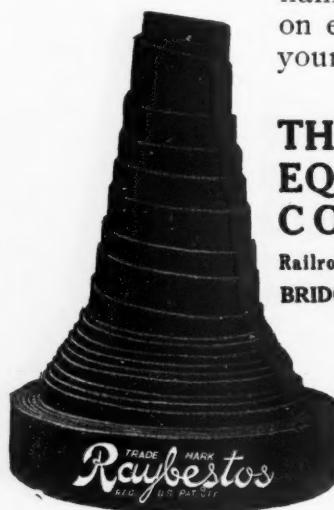
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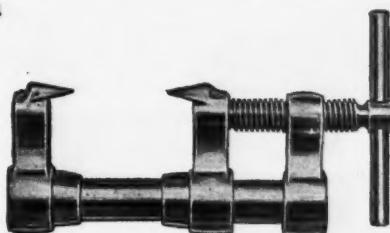
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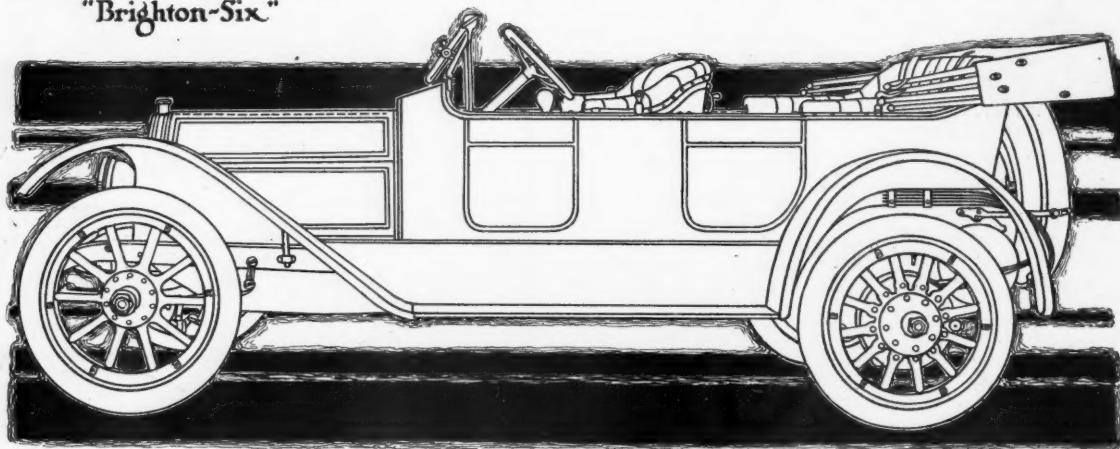
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Our 1914 Dealer's Proposition will interest you if you are the right kind of Dealer to sell "The Strongest Built Car in the World."

Write to-day.

Palmer & Singer Mfg. Company, Factory, Long Island City
NEW YORK CITY
WESTERN BRANCH (Territory, Pittsburgh to Pacific Coast), 2638-40 MICHIGAN AVE., CHICAGO



I-Beam, Steering-Arm, Rear Axle Drive-Shaft and Knuckle, bent and twisted by powerful machines to test the toughness of the steel.

There's Safety in Axles that Stand Tests Like This—

—Safety in axles designed to meet the maximum stresses of every-day travel with a *big margin to spare*—built of materials so good that, if accident does bring strains beyond what the axles should bear, they will *stand right up to the last ounce of pressure and the last severe shock*—then *bend but not break*.

WHEN Harry Knight drove his racer head-on into a concrete wall at the Speedway May 30, 1911, to save another man's life, the Timken Front Axle was bent by the intense impact. But that axle was afterward straightened and is running under a car today.

It is because Timken-Detroit Axle parts are so tough that they *can* be bent, twisted and flattened, cold, *without breaking*, that the man who rides on Timkens *can confidently count on riding safely*.

It requires terrific blows and tons of pressure, in special testing-machines, to bend these big, tough, cold, steel I-beams, steering arms, knuckles and driving shafts.

Tests like this are necessary to *prove* in our factory that the work of the steel-makers, the chemists, engineers and metallurgists was right.

To prove that, while wonderfully tough and strong, Timken-Detroit Axles *are not brittle*.

That the I-beams and spindles will not break under the weight of the loaded car as it drops suddenly into a deep rut or bumps over steel rails. Nor will a steering-arm, or a steering cross-rod snap, and leave the car unmanageable.

Problems in Safety

To get steel that is strong enough, and hard enough to stand the steady stress; and yet so tough that it cannot break under sudden shock, has been no simple problem. And to get it without undue weight has been another problem.

These problems could not be solved through knowledge of the chemistry of steel alone. It meant

testing samples of steels from all over the world, observing and recording the effect on these steels of heating them to different temperatures and quenching them in different baths.

Concentrated Study

Out of the multiplicity of analyses, heat-treatments and testings, and out of long experience in every type of car under all conditions of service, has come the best steel for each axle part, and the best formulas for heat-treatment of each part.

Only concentrated devotion to the one problem of axle-building could determine the right steel and the right heat-treatment—just as it has developed the right design, size and relation of the different axle parts.

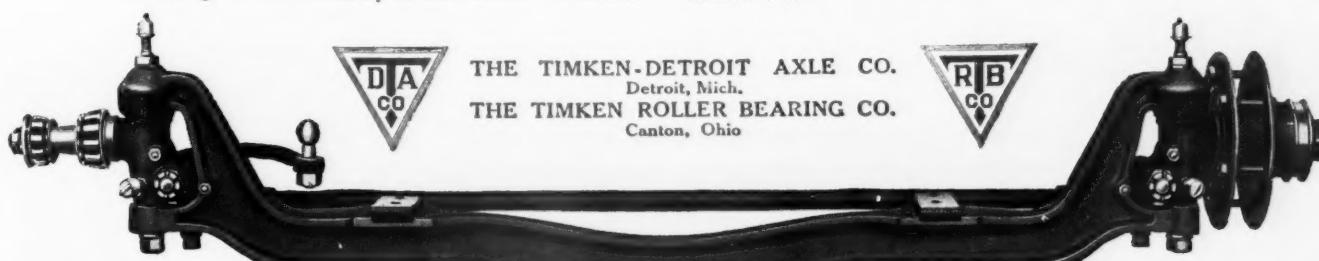
And Still More Study

Although Timken-Detroit Axles justified themselves from the very beginning of the automobile industry by satisfactory service in motor-cars, pleasure and commercial, the work of study, experiment and investigation has continued through all the years that have followed. It has made, and is making every year, new contributions to the wonderful things accomplished in this Twentieth Century by heat-treatment.

The safety and satisfaction of the man who rides on Timken-Detroit Axles are secure because back of the axle is the great human organization that has worked together for one common object during all the years of motor-car manufacture.

There are no more important parts of your car than the axles and their bearings. Why this is so is told in the Timken Primers, T-5 "On the Anatomy of Automobile Axles," and T-6 "On the Care and Character of Bearings." Sent free postpaid, from either address below.

THE TIMKEN-DETROIT AXLE CO.
Detroit, Mich.
THE TIMKEN ROLLER BEARING CO.
Canton, Ohio



—Why Dealers Lose Money

By C. P. Henderson

Years of concentrated study of conditions the automobile dealer faces have taught the faults that cost dealers their profits—how these things can be avoided—dealers who work for the manufacturer, not for themselves.



89% of all automobile dealers work for the manufacturer, not for themselves.

At the height of the selling season they sell cars the manufacturer can't deliver.

Some cars have chronic defects—the public learns them—dealers lose sales.

Some cars selling today are in reality 1911 models—not salable, yet they are crowded onto dealers. Eventually they go at a sacrifice of several hundred dollars. The manufacturer has *his profit*, the dealer *his loss*.

Every dealer should be selling and delivering 1914 models *today*.

There are myriads of other reasons why dealers lose, selling the average car, *even though it has a large sale*.

How We Conquered Resistance.

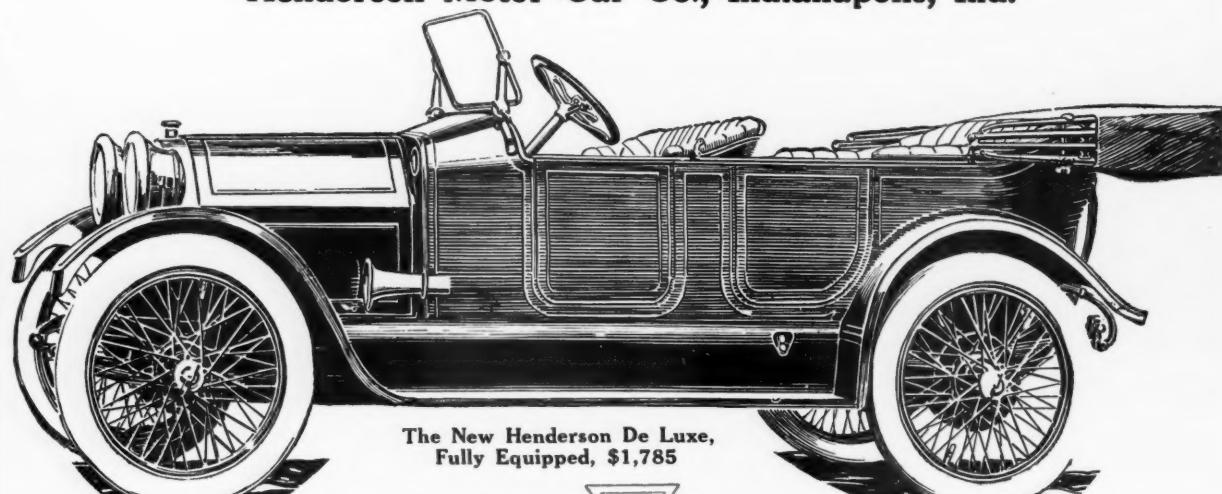
But we have conquered every resistance in the Henderson car. Our 1914 models are out today—Henderson dealers are *selling them—and DELIVERING them*.

We build one year ahead of average cars—for instance, today a prospect can purchase a kerosene-burning car, a wire-wheeled car, the cowl dash, the cowl gasoline tank, left drive, center seat control and, of course, electric self-cranking system and electric lights on the Henderson.

Buyers can get Hendersons *Now*.

These facts are vital to every dealer—they mean dealer *profit*. Is not such a line of cars exactly what you must have to make money, or to make *more* than you made last year? Other dealers in your territory are reading this article. They will write us about the line. *You write today*.

Henderson Motor Car Co., Indianapolis, Ind.



The New Henderson De Luxe,
Fully Equipped, \$1,785

HENDERSON